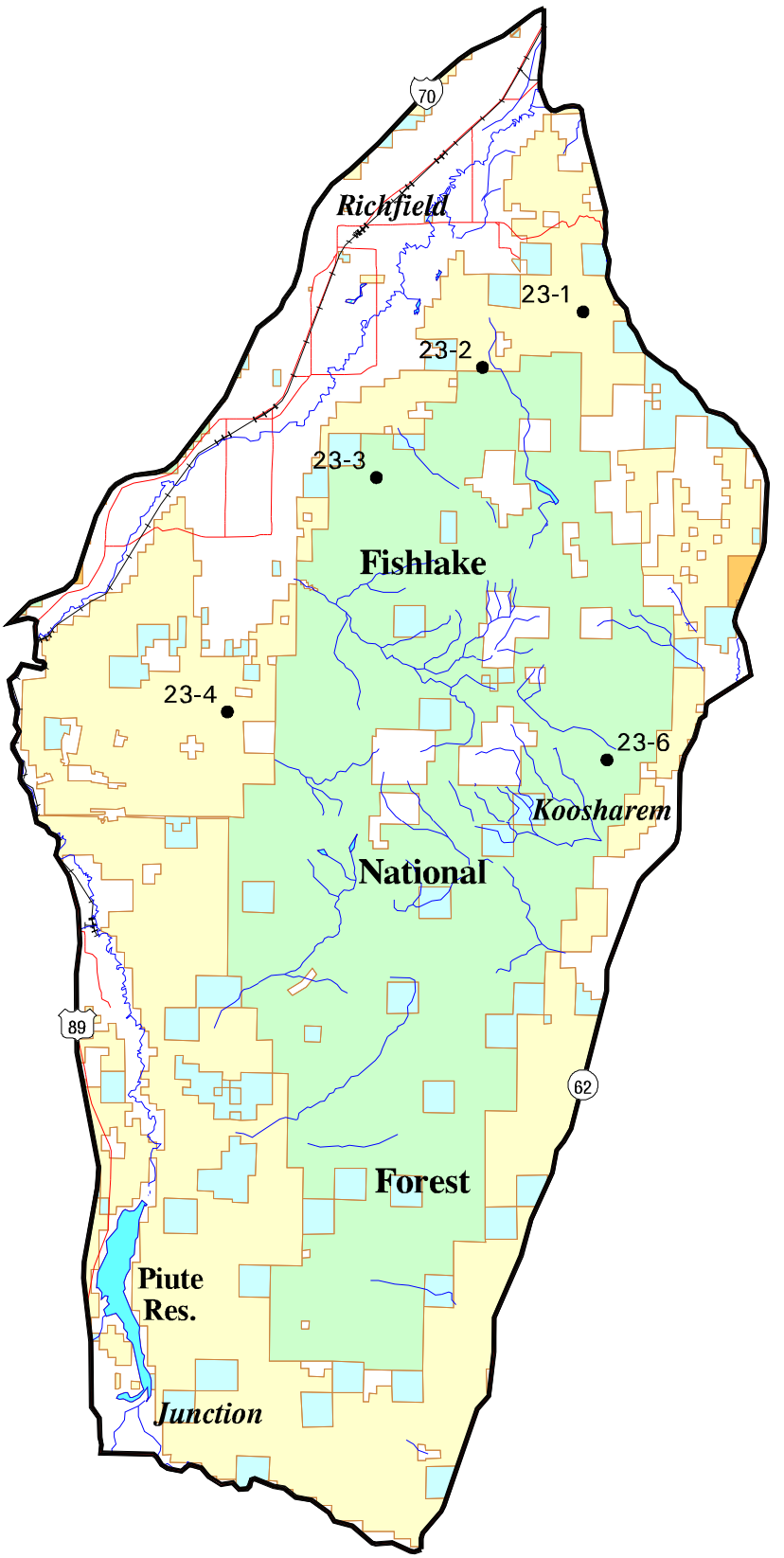
Management Unit 23

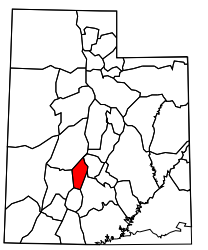


Legend

- Forest Service
- BLM
- State of Utah
- Native American
- Private Land
- Water Body
- Transect Location
- Road
- Railroad
- Perennial Stream

N

Unit Location



Map Scale 1:364,320 (1" = 5.75 miles)

UDAF GIS May, 2000

WILDLIFE MANAGEMENT UNIT- 23 (45) - MONROE

Boundary Description

Piute and Sevier counties - The boundary begins at Interstate 70 and highway U.S. 89 at Sevier; then south on US-89 to highway SR-62; then east and north on SR-62 to highway SR-24; then on SR-24 to I-70; south on I-70 to US-89 and beginning point.

Management Unit Description

Unit 23, located in central Utah, completely encompasses Monroe Mountain for which it is named. This mountain is oriented north and south with drainages to the east, south and west. All of the water from the mountain eventually enters the Sevier River, either directly from the west side of the mountain or via tributaries (Otter Creek and the east fork of the Sevier River) on the east and south sides. The top of the mountain is relatively flat and has a good mixture of spruce-fir forests, aspen stands, sagebrush flats, and meadows. Numerous springs, small lakes, and reservoirs provide reliable water sources for both livestock and wildlife. Signal Peak at 11,223 feet and Monroe Peak at 11,227 feet are the elevational high points. The municipalities located within the unit boundaries are Richfield, Sigurd, Elsinore, Joseph, Sevier, Marysvale, Junction, Kingston, Angle, Greenwich, and Koosharem.

Winter range is still considered the limiting factor for the unit's elk and deer herds. The upper limits of the normal range extend to 8,000 feet on the southern end of the mountain and 7,800 feet on the northern end. During severe winters, the upper limit drops to about 7,800 feet on the southern end, and 6,800 feet on the northern end. Deer wintering on the north end are particularly susceptible to winter loss during harsh winters when the winter range is severely restricted by deep snows. Winter concentration areas for deer are between Glenwood and Poverty Flat on the west side and between Burrville and Greenwich on the east side. The units elk herd splits each winter with part wintering near Greenwich and part wintering near Marysvale. Crop depredation problems occur each year in the fields near Greenwich and Monroe. Revegetation of adjacent pinyon-juniper areas is an ongoing task to provide an alternate forage source for these problem animals. In addition, a 2-mile stretch of experimental high-tension electric fence was built across the top of a field south of Monroe. This fence has helped eliminate depredation problems on that particular field when it is maintained properly.

Huff and Blotter (1964) did the initial winter range survey. They reported acreages and percent cover of preferred deer browse for four general winter range vegetative types. Pinyon-juniper made up 62% of the winter range with 13% of the browse preferred by deer. The sagebrush, mixed, and mountain brush types cover 27%, 7%, and 4% of the winter range respectively. With regard to these last three vegetative types, percent preferred browse made up 14%, 18%, and 39% of these vegetative types respectively. The pinyon-juniper type, which provides good protective cover, but is a less productive source of preferred browse, appears to be slowly encroaching into other vegetative types. Estimate of total acreage for normal winter range is 146,000 acres. Mann (1985) determine how much additional acreage would be needed. He determined that approximately 2,026 acres needed to be acquired from private landowners to help maintain the herd at its present numbers.

The summer range is in fairly good condition despite a history of overgrazing by livestock. More restrictive grazing plans have resulted in an upward trend in vegetative composition and vigor in recent years. The gentle topography, abundance of water with an interspersion of forage and cover provide quality fawning, calving, and summering areas for both deer and elk. Fawn production and survival is normally good. The ratio of fawns per 100 does was 82 between 1975-84 (Jense et al. 1985). It had fallen to 76 fawns/100 does with the prolonged drought since 1985 (Jense et al. 1991). The summer range has an extensive network of roads with new roads having been proposed for timber sales. These roads and the associated activities can cause stress on the wildlife and affect their land use patterns. Some road closures would be beneficial to the

units big game populations in the future. Many summer homes have been built and more will likely be built in the future on the parcels of private land scattered throughout the summer range. The mountain is used for camping and fishing during the summer, and hunting in the fall.

The Monroe Mountain unit has been a productive deer unit providing excellent hunting opportunities in the past. Between 1951 and 1971, an average of 1,456 bucks were taken for a yearly hunter success rate averaging over 75% (Jense et al. 1985). A combination of overharvesting does during the either sex hunts of 1971 and 1972, a drought during 1974-75 and the devastating winters of 1972-73 and 1978-79, resulted in low population levels in the late 1970's and early 1980's, but the herd has rebounded well and is once again nearing carrying capacity. The lower deer numbers reduced pressure on the forage, and combined with good water years from 1982 through 1985, resulted in improved range conditions. Because of the great variations in deer harvest through time, a regression of deer harvest from 1950 to 1990 gives a more realistic indication of overall trend through the last forty years. The regression of the trend actually shows a 5% decline.

The Monroe Mountain elk herd unit boundaries are the same as the deer herd unit boundaries. This is a new elk unit. The first elk hunt was held in 1982. Ten bull permits have been issued each year since, with 21 mature bulls and 3 spikes harvested during the 1982, 1983 and 1984 hunts (Jense et al. 1985). Since 1985, the number of bull permits have remained about the same until 1990 with a more than 30% increase in permits and over 50 antlerless permits. The elk population appears to be increasing at this time.

Bear Ridge, Sols Meadow, Thompson Basin, Poverty Flat, Smith Canyon and Koosharem Canyon were chosen as study sites by an interagency committee of Forest Service, BLM, and DWR personnel. These permanent range trend transects were established and read in 1985, and reread in both 1991 and 1998.

Trend Study 23-1-98

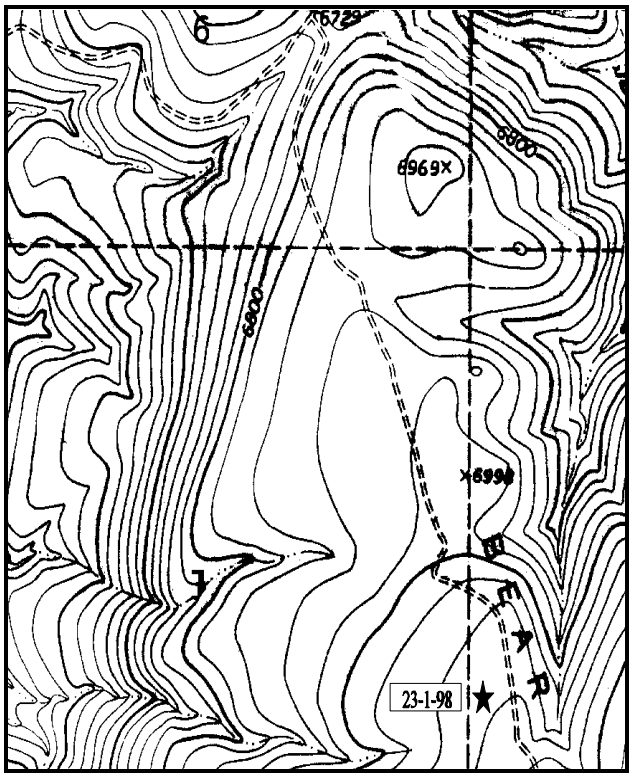
Study site name: Bear Ridge . Range type: Pinyon-Juniper.

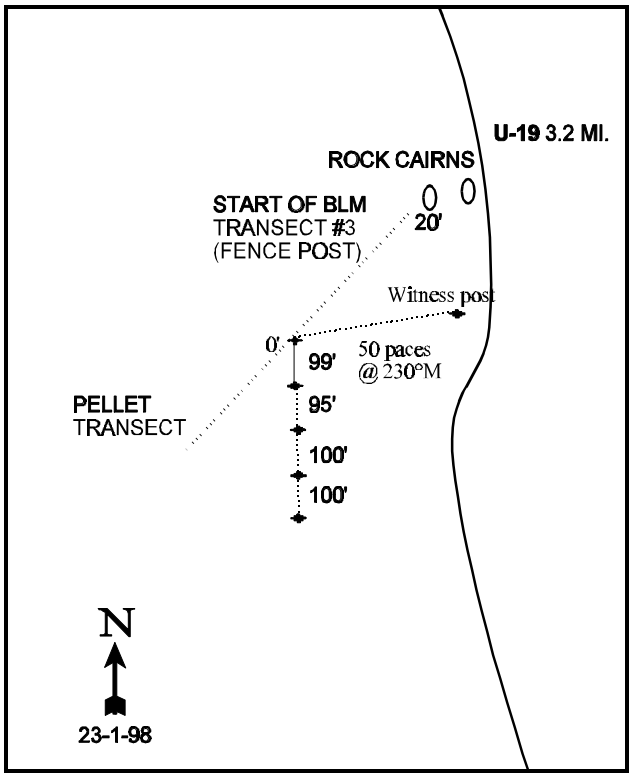
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Richfield, go east on Highway 119 to the junction of U-24. One hundred yards before the intersection there is a dirt road to the right (west) off of Highway 119. Follow this road for 1.5 miles to a hairpin turn, keep right. Go 0.55 miles to a fork, bear left and go 1.15 miles more to a witness post on the west side of the road. Walk 50 paces at 230 degrees magnetic to the 0-foot baseline stake. The trend study stakes are rebar 2-1/2 feet tall, the first one has a browse tag #7038 attached.





Map Name: Water Creek Canyon, Utah Diagrammatic Sketch

Township 24S , Range 1W , Section 8 UTM 4287487.128 N, 418334.021 E

DISCUSSION

Trend Study No. 23-1 (45-1)

The Bear Ridge study site is located near the top of Bear Ridge. It has a gentle slope (5-10%) and a southwest aspect. The ridge is covered by a mature pinyon-juniper stand with a fairly abundant understory of shrubs and herbaceous vegetation. The 7,000 foot elevation is still within the limits of normal winter range. The range trend study samples the same area as the Bell Rock pellet group transect. Counts from the pellet transect show that deer use has remained relatively stable through 1985 with an average of 22 deer days use/hectare (Jense et al. 1985). The average at that time was low when compared to data from the other pellet group transects in the herd unit. Deer use from 1985 to 1991 averaged almost 36 deer days use/hectare (Jense et al. 1991). There was no sign of elk use at that time. In 1998, a pellet group transect indicated that deer use was up to 52 deer days use/acre, while some elk use was noted (8 elk days use/acre). Livestock grazing pressure still appears to be light on this BLM land.

The soil is covered by a layer of erosion pavement and rocks. Currently, this covers almost 38% of the soil surface. More than one-third of the ground cover is made up of rock and pavement. Percent bare soil has varied from a low of 10%, to where it is now at its highest value (21%) with only fair herbaceous cover and relatively high amounts of litter. It would appear that some sheet erosion has occurred with the prominence of pavement and rock cover on the soil surface. However, it is only serious on the steeper slopes. Initially, the percent bare ground was thought to be low for a pinyon-juniper community, but now it is moderately high at 21%. Soil textural analysis indicates it to be a loam to clay loam with a neutral to mildly alkaline pH (7.3). Effective rooting depth is just over 11 inches with a soil temperature of 64°F at almost 13 inches in depth. The amount of phosphorus in the soil could be a limiting factor in the soil at only 9 ppm, which is below the minimum thought necessary for normal plant development.

The pinyon-juniper woodland is beginning to affect the understory of shrubs and herbaceous species. Point-centered quarter data in 1998 estimates the density of juniper to be 213 trees/acre with an average diameter of nearly 9 inches. Pinyon has a density of 115 trees/acre and an average diameter of almost 5 inches. Canopy cover for pinyon-juniper trees is 10%. This kind of density and cover will normally decrease understory production by as much as 40%.

Mountain big sagebrush, black sagebrush, and antelope bitterbrush are all important browse species, currently making up 40% of the browse cover. Most of both the mountain and black sagebrush plants were classified as decadent in 1991, with many dead plants evident. This has not changed much in 1998. Black sagebrush has no seedlings and a very low percent young age class. Percent decadence has gone down from a high of 77% in 1991, to a low of 34% in 1998, which is lower than that observed in 1985 (53%). Those classified with poor vigor have decreased. Currently, about 40% of the population has died off, and those plants classified with heavy use has decreased to zero. For the future, it appears that more of the population will be lost as the percentage of the decadent plants classified as dying has steadily increased through all years. The mountain big sagebrush are having a more difficult time persisting on this site because biotic potential is zero, and the percent of plants in the young age class is at its low (9%). Also, those classified with poor vigor have steadily increased to a current level of 40%, percent decadence has increased to it's highest value since 1985 at 67%, and the percentage of dead plants is up to 68% at this time. All this points to only one thing, a strongly downward trend for mountain big sagebrush. The bitterbrush, although heavily hedged, looks healthier with percent decadence down to 8%. Numbers are up and it now makes up 16% of the browse cover. Presently, there is acceptable amounts of forage production and excellent cover for wildlife.

Herbaceous vegetation is dominated by perennial grasses where they contribute 93% of the herbaceous cover. Large, vigorous bluebunch wheatgrass plants are most common. Normally a decreaser under heavy cattle grazing, it has a high yield and good forage value on spring and early summer ranges. Sandberg bluegrass, bottlebrush squirreltail, and Indian ricegrass are also fairly common. Forbs are almost nonexistent on this

site. Trend for herbaceous understory is stable as sum of nested frequency values have remained relatively stable.

1985 APPARENT TREND ASSESSMENT

The soil trend is basically stable. Vegetative trend is apparently down. The pinyon-juniper overstory is closing in, and due to heavy use coupled with competition with the trees, there is little reproduction of the key browse species. Chaining and reseeding would help restore the area, but treatment is not yet critical as forage production and erosion control are still within acceptable limits.

1991 TREND ASSESSMENT

With the increase in bare ground from 10% to 15%, and percent cover for rock and pavement decreasing to 30%, the trend would be considered slightly down for vegetative basal cover is barely 6%. The key browse species, black sagebrush, mountain big sagebrush, and bitterbrush all show different stages of a downward trend. Black sagebrush didn't change much in density, but percent decadency went from 53% to 77%. Mountain big sagebrush lost 24% of it's population with the proportion of decadent plants also increasing. The bitterbrush's density went down by 13% and rate of decadency went up to 29%. The herbaceous species show a slight upward trend for grasses and forbs. There are still very few forbs present on the site, although quadrat frequency and nested frequency values have increased for the most part.

TREND ASSESSMENT
soil - slightly downward
browse - downward
herbaceous understory - slightly upward

1998 TREND ASSESSMENT

The trend for soil is slightly downward again. Percent bare soil has been increasing each time about 5 to 6%, where it is currently up to 21%. The ratio of protective cover to bare soil is also marginal. This site is basically becoming more dominated by juniper and pinyon and its effect on the understory species has been intensified by an extended period of drought. The trend for browse, especially key browse, is downward again. Black sagebrush which contributes 11% of the browse cover, continues with most measured parameters indicating a downward trend. Mountain big sagebrush (makes up 13% of the browse cover) also has most of its measured parameters showing a downward trend, even more so than black sagebrush. Currently, 68% of the population is dead with percent decadence continually increasing where it is now at its highest value (67%). Bitterbrush, which provides 16% of the browse cover, is the only key browse that shows any kind of improvement. However, it cannot compensate for the losses to the two sagebrush species. The herbaceous understory trend is stable to slightly upward. However, the herbaceous species still barely provide 12% total cover. This trend is primarily because of the grasses, for the forbs contribute less than one percent cover and provide little cover or forage.

TREND ASSESSMENT
soil - slightly downward
browse - downward
herbaceous understory - stable to slightly upward

HERBACEOUS TRENDS --
Herd unit 23 , Study no: 1

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Agropyron spicatum	$_{b}$227	$_{b}$227	$_{a}$183	79	84	68	7.78
G	Bromus tectorum (a)	-	-	42	-	-	14	.43
G	Oryzopsis hymenoides	4	12	12	2	4	4	.17
G	Poa fendleriana	$_{a}$6	$_{b}$36	$_{b}$49	3	16	21	.98
G	Poa secunda	$_{a}$3	$_{b}$18	$_{c}$94	1	10	40	2.00
G	Sitanion hystrix	$_{b}$25	$_{ab}$20	$_{a}$6	13	9	3	.01
Total Annual Grasses		0	0	42	0	0	14	0.43
Total Perennial Grasses		265	313	344	98	123	136	10.96
F	Agoseris glauca	-	10	1	-	5	1	.00
F	Arabis spp.	$_{a}$-	$_{b}$18	$_{a}$1	-	9	1	.00
F	Astragalus convallarius	$_{a}$2	$_{a}$4	$_{b}$6	1	1	6	.15
F	Calochortus nuttallii	$_{ab}$4	$_{b}$8	$_{a}$-	2	4	-	-
F	Chaenactis douglasii	-	-	1	-	-	1	.03
F	Comandra pallida	-	-	3	-	-	1	.03
F	Collinsia parviflora (a)	-	-	3	-	-	1	.00
F	Crepis acuminata	-	6	7	-	2	2	.06
F	Eriogonum racemosum	-	-	4	-	-	1	.03
F	Eriogonum umbellatum	-	1	9	-	1	5	.16
F	Lomatium spp.	-	-	1	-	-	1	.00
F	Phlox austromontana	-	6	4	-	3	2	.16
F	Physaria chambersii	1	4	-	1	2	-	-
F	Phlox longifolia	$_{a}$8	$_{b}$27	$_{a}$16	4	14	6	.20
F	Unknown forb-perennial	3	1	-	1	1	-	-
Total Annual Forbs		0	0	3	0	0	1	0
Total Perennial Forbs		18	85	53	9	42	27	0.84

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 23 , Study no: 1

Type	Species	Strip Frequency ‘98	Average Cover % ‘98
B	Artemisia nova	35	2.24
B	Artemisia tridentata vaseyana	40	2.54
B	Chrysothamnus depressus	1	-
B	Chrysothamnus viscidiflorus viscidiflorus	1	.15
B	Gutierrezia sarothrae	2	-
B	Juniperus osteosperma	4	5.51
B	Opuntia spp.	1	.15
B	Pinus edulis	4	5.99
B	Purshia tridentata	18	3.20
Total for Browse		??	19.79

CANOPY COVER --
Herd unit 23 , Study no: 1

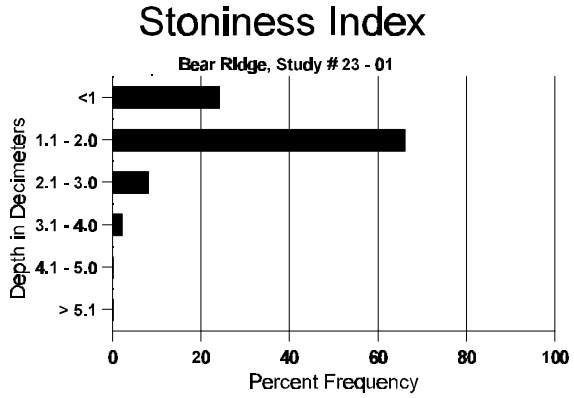
Species	Percent Cover ’98
Juniperus osteosperma	7
Pinus edulis	3

BASIC COVER --
Herd unit 23 , Study no: 1

Cover Type	Nested Frequency ‘98	Average Cover % '85	'91	'98
Vegetation	274	2.00	5.75	30.04
Rock	216	6.00	5.25	11.18
Pavement	279	30.50	24.25	26.32
Litter	381	46.50	46.50	42.49
Cryptogams	46	5.00	3.00	.93
Bare Ground	254	10.00	15.25	21.42

SOIL ANALYSIS DATA --
Herd Unit 23, Study # 01, Study Name: Bear Ridge

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.2	64.4 (12.7)	7.3	40.0	33.4	26.6	3.4	9.0	57.6	.5



PELLET GROUP FREQUENCY --
Herd unit 23 , Study no: 1

Type	Quadrat Frequency '98
Rabbit	25
Elk	4
Deer	36

BROWSE CHARACTERISTICS --
Herd unit 23 , Study no: 1

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia nova																		
S	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	1	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	-	2	1	-	-	-	-	-	-	2	-	-	1	200			3
	91	-	-	-	1	-	-	-	-	-	1	-	-	-	66			1
	98	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	85	1	8	4	-	-	-	-	-	-	11	-	2	-	866	13	21	13
	91	2	4	1	-	-	-	-	-	-	6	-	-	1	466	9	16	7
	98	16	21	-	2	-	-	-	-	-	39	-	-	-	780	16	23	39
D	85	-	7	11	-	-	-	-	-	-	13	-	2	3	1200			18
	91	8	7	6	3	-	1	1	-	-	20	-	-	6	1733			26
	98	10	11	-	1	-	-	-	-	-	16	-	-	6	440			22
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	860			43

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	50%	47%	24%	- 0%
'91	32%	24%	21%	-43%
'98	49%	00%	09%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	2266	Dec:	53%
	'91	2265		77%
	'98	1300		34%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	91	-	-	-	1	-	-	4	-	-	5	-	-	-	333			5
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	-	2	1	-	-	-	-	-	-	3	-	-	-	200			3
	91	4	-	-	1	-	-	-	-	-	5	-	-	-	333			5
	98	2	-	-	3	-	-	-	-	-	5	-	-	-	100			5
M	85	1	4	1	-	-	-	-	-	-	4	-	2	-	400	13	15	6
	91	-	-	1	-	-	-	-	-	-	1	-	-	-	66	12	13	1
	98	2	9	1	1	-	-	-	-	-	12	-	1	-	260	15	23	13
D	85	1	8	3	-	-	-	-	-	-	11	-	1	-	800			12
	91	5	3	-	2	-	-	-	-	-	4	-	-	6	666			10
	98	14	22	-	1	-	-	-	-	-	16	-	6	15	740			37
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	4	-	-	-	2300			115

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	67%	24%	14%	-24%
'91	19%	06%	38%	+ 3%
'98	56%	02%	40%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	1400	Dec:		57%
'91	1065			63%
'98	1100			67%

Chrysothamnus depressus																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	1	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	0	Dec:	-
'91	0		-
'98	20		-

Chrysothamnus viscidiflorus viscidiflorus																		
Y	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200	12	11	3
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	10	12	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	400	Dec:	-
'91	0		-
'98	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	9	9	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	-39%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	66		-
	'98	40		-

Juniperus osteosperma																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	2	-	-	-	-	-	2	-	-	-	40			2
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	2	-	-	-	-	-	-	-	-	1	-	-	1	133			2
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	85	-	-	-	3	-	-	-	-	-	3	-	-	-	200	69	64	3
	91	-	-	-	-	1	1	-	-	1	3	-	-	-	200	152	98	3
	98	-	-	-	-	-	-	-	2	-	2	-	-	-	40	-	-	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+20%
'91	20%	40%	20%	-76%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	266	Dec:	-
	'91	333		-
	'98	80		-

Opuntia spp.																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	8	12	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	60		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Pinus edulis																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	2	-	-	-	-	-	2	-	-	-	133	69	64	2
	91	1	-	-	1	-	-	-	-	-	2	-	-	-	133	133	104	2
	98	3	-	-	-	-	-	1	-	-	4	-	-	-	80	-	-	4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	00%	00%	-40%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	133	Dec:		-
'91	133			-
'98	80			-

Purshia tridentata																		
S	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	1	-	1	-	-	-	-	-	-	2	-	-	-	133			2
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	85	-	5	-	-	-	-	-	-	-	5	-	-	-	333	24	42	5
	91	-	-	1	-	2	-	-	-	-	3	-	-	-	200	19	35	3
	98	18	13	-	2	-	-	-	-	-	33	-	-	-	660	22	41	33
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	1	-	-	-	1	-	-	-	1	1	-	-	133			2
	98	1	1	-	1	-	-	-	-	-	1	-	-	2	60			3
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	63%	00%	00%	-13%
'91	43%	43%	00%	+39%
'98	37%	00%	05%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	533	Dec:		0%
'91	466			29%
'98	760			8%

Tetradymia canescens																		
M	85	-	1	-	-	-	-	-	-	-	1	-	-	-	66	7	4	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	100%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	66	Dec:		-
'91	0			-
'98	0			-

Trend Study 23-2-98

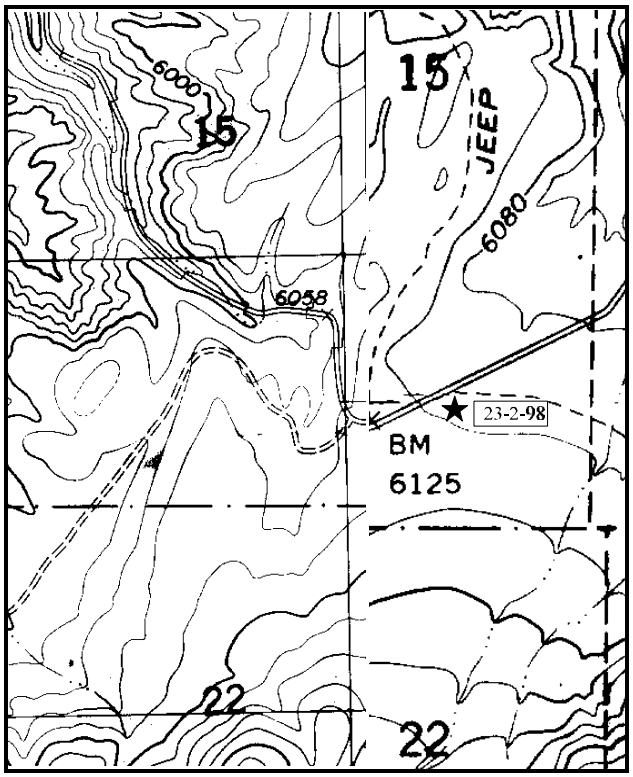
Study site name: Sols Meadow . Range type: Big Sagebrush-Grass .

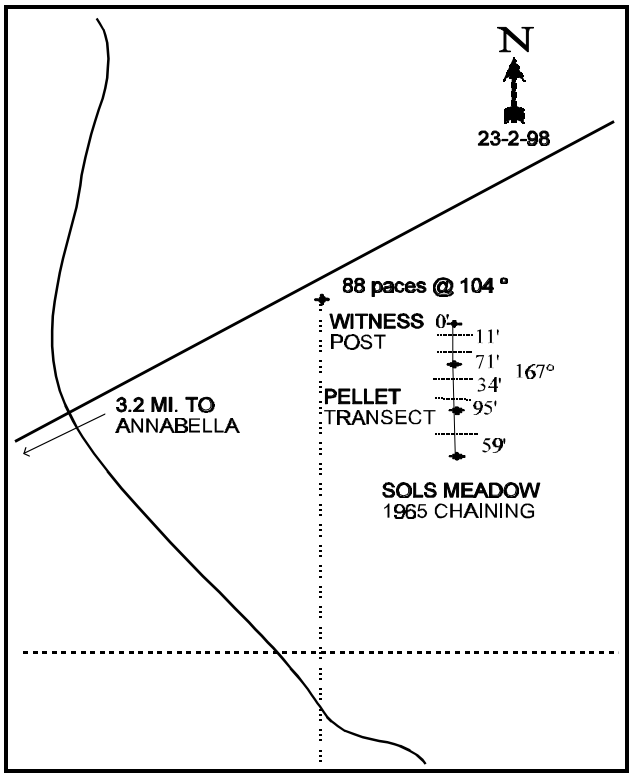
Compass bearing: frequency baseline 167 M degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 71ft), line 2 (34 & 95ft), line 3 (59ft).

LOCATION DESCRIPTION

Starting from the Annabella cemetery go northeast 0.1 miles to a cattleguard. Bear left. Go 0.4 miles and cross under a powerline. Continue 1.5 miles to the BLM boundary sign, then 1.2 miles more to a fork in the road. Continue straight 0.1 miles on the main road to a green and yellow fencepost on the right. The rebar marking the 0-foot end of the frequency baseline is 27 paces at 104 degrees from the green and yellow fencepost (which marks the start of a pellet transect).





Map Name: Water Creek Canyon, Utah Diagrammatic Sketch

Township 24S , Range 2W , Section 15 UTM 4284665.953 N, 413213.472 E

DISCUSSION

Trend Study No. 23-2 (45-2)

The Sols Meadow study site is on BLM land that was chained and aerially seeded with crested wheatgrass in 1965. The junipers are re-establishing their dominance on the site, but Wyoming big sagebrush is presently the most abundant species. The juniper density is now estimated by point-centered quarter data at 19 trees/acre with an average diameter (at 6 inches) at just over 5 inches. Juniper canopy cover is only 1%. Currently, the seeding has permits for 22 AUM's for cattle in May, June and October. Sheep do not use this portion of the allotment. Deer use has generally been moderate in the area as determined by the Maple Creek pellet group transect. The pellet group transect that was read parallel to the vegetative transect indicated deer use at 97 deer days use/acre, 19 elk days use/acre, and cattle at 3 cow days use/acre.

The site is a dry, gentle, north facing slope (3-5%), located on the northwest side of the Monroe Mountains. The soil developed on an old alluvial fan from sandstone, shale, quartzite, and limestone parent materials. The light-brown soil is a sandy loam with a neutral to slightly acidic pH (6.6). Effective rooting depth is almost 17 inches with a soil temperature of 55ºF at 18 inches. The organic matter content is low with a low site potential. Phosphorus is low at 8.6 ppm, which could be a limiting factor to plant development. Litter and vegetative cover are good around and under the sagebrush plants and junipers. The interspaces are mostly bare soil or have a cover of annuals and pavement. Erosion has not been a serious problem because of the negligible slope, but should be monitored closely.

The key species is Wyoming big sagebrush. It currently provides 87% of the browse cover and is the only browse species present except for Utah juniper. Young and mature junipers, averaging 8-10 feet tall, are scattered throughout the old chaining. These trees showed no evidence of deer browsing. Initially, the sagebrush population appeared healthy and expanding. The number of seedlings almost equaled the number of decadent plants, and the rest of the population were vigorous young and mature plants. Most of the larger plants were moderately hedged, but some individuals had been quite heavily browsed. The more heavily browsed plants are the hybrids between Wyoming big sagebrush and mountain big sagebrush. Sagebrush density was good in 1985, with 5,398 plants/acre. Since that time biotic potential has steadily decreased, along with the percentage of young plants in the population. Percent decadence has been as high as 52%, where it is currently still high at 44%. Thirty-four percent of the population is now classified as dead. With the percentage of decadent plants classified as dying still high at 32%, the percentage of dead plants in the population could go up to 40%. Trend for sagebrush is continuing to go down. This downward trend corresponds to the same time period that extended drought was also occurring throughout the area. Pricklypear cactus, an increaser, is prevalent in large patches, but now occurs in low numbers.

The number and diversity of herbaceous species is very low. The most common perennial species is crested wheatgrass. It grows tall and vigorous, but only under the protection of the sagebrush. Cheatgrass grows mostly in the shrub interspaces, currently making up 61% of the grass or herbaceous cover as the forb cover is almost nonexistent. Forbs that are there are mostly small, low-value annuals.

1985 APPARENT TREND ASSESSMENT

The trend for soil appears stable. Soil movement is kept to a minimum by the gentleness of the terrain. In terms of the key species, their form, vigor, and age class distribution appear stable. However, the community is slowly changing as many junipers not controlled with the chaining have been released from adult competition and are quickly growing to maturity.

1991 TREND ASSESSMENT

Most measured parameters for soil did not change except for percent pavement and bare ground. Bare ground increased from 21% to 31% while percent pavement decreased from 25% to 16%. This increase in bare ground indicates a slight downward trend for soil which should be watched closely. This could be just an effect of the extended drought, where drought would effect litter and vegetative cover. The Wyoming big sagebrush has shown an increase of 16% in it's population, but it's rate of decadency has gone up from 12 to 52%. Another critical parameter is that the percentage of the population that is expressing poor vigor has gone from 6% up to 23% in 1991. These downward changes could directly be attributed to the extended drought, but percent decadency and vigor should improve with more normal precipitation patterns. There are not very many species of grasses or forbs on the site. Quadrat frequency for grasses are good, with 50% for crested wheatgrass and 13% for bottlebrush squirreltail. Trend for herbaceous understory is up since the last inventory.

TREND ASSESSMENT
soil - slightly downward
browse - stable to slightly downward, depends on the recovery of the sagebrush from poor vigor (23%) and high rates of decadency (52%)
herbaceous understory - slightly upward, but still in poor condition because of low species diversity and frequencies

1998 TREND ASSESSMENT

Trend for soil is slightly up at this time with percent bare soil decreasing from 31% to 22%. The only key browse species is Wyoming big sagebrush, which is continuing to show downward trends for most of the measured parameters. Trend for browse is down. Trend for herbaceous understory is stable, with sum of nested frequency remaining relatively stable.

TREND ASSESSMENT
soil - slightly up
browse - down
herbaceous understory - stable, but cheatgrass dominates by making up 61% of the herbaceous understory cover

HERBACEOUS TRENDS --
Herd unit 23 , Study no: 2

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Agropyron cristatum	97	114	132	46	50	53	7.03
G	Bromus tectorum (a)	-	-	252	-	-	83	11.73
G	Sitanion hystrix	$_{a}$4	$_{b}$26	$_{ab}$10	1	13	7	.45
Total Annual Grasses		0	0	252	0	0	83	11.73
Total Perennial Grasses		101	140	142	47	63	60	7.49
F	Alyssum alyssoides (a)	-	-	2	-	-	1	.00
F	Eriogonum cernuum (a)	6	5	-	3	3	-	-
F	Euphorbia spp.	-	-	2	-	-	1	.00
F	Gayophytum ramosissimum (a)	-	-	3	-	-	1	.00

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
F	Sisymbrium altissimum (a)	-	19	-	-	8	-	-
F	Stephanomeria pauciflora	3	-	-	1	-	-	-
Total Annual Forbs		6	24	5	3	11	2	0
Total Perennial Forbs		3	0	2	1	0	1	0.01

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 23 , Study no: 2

Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia tridentata wyomingensis	78	12.83
B	Gutierrezia sarothrae	2	-
B	Juniperus osteosperma	3	2.00
B	Opuntia spp.	4	-
Total for Browse		87	14.83

CANOPY COVER --
Herd unit 23 , Study no: 2

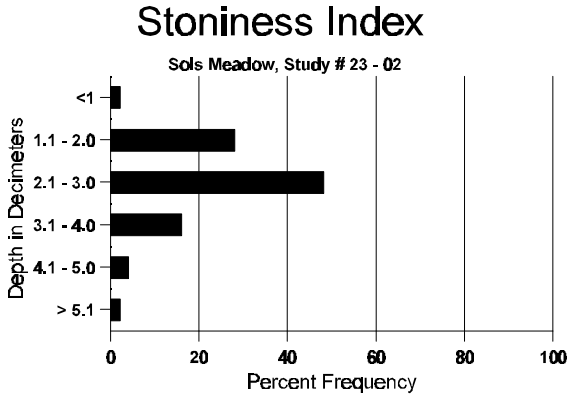
Species	Percent Cover '98
Juniperus osteosperma	1

BASIC COVER --
Herd unit 23 , Study no: 2

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	321	5.00	3.75	31.53
Rock	119	5.00	2.00	4.00
Pavement	227	25.00	16.00	7.97
Litter	393	44.25	46.00	45.56
Cryptogams	72	0	1.50	1.85
Bare Ground	269	20.75	30.75	21.92

SOIL ANALYSIS DATA --
Herd Unit 23, Study # 02, Study Name: Sols Meadow

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.9	54.5 (17.7)	6.6	62.0	19.4	18.6	1.2	8.6	115.2	.5



PELLET GROUP FREQUENCY --
Herd unit 23 , Study no: 2

Type	Quadrat Frequency '98
Rabbit	57
Elk	11
Deer	52
Cattle	1

BROWSE CHARACTERISTICS --
Herd unit 23 , Study no: 2

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	85	9	-	-	-	-	-	-	-	-	8	-	1	-	600			9
	91	2	-	-	-	-	-	1	-	-	3	-	-	-	200			3
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	85	23	7	4	-	-	-	-	-	-	33	-	1	-	2266			34
	91	11	3	-	3	-	-	-	-	-	16	1	-	-	1133			17
	98	4	8	-	-	-	-	-	-	-	12	-	-	-	240			12
M	85	8	20	9	-	-	-	-	-	-	34	-	3	-	2466	18	23	37
	91	20	7	-	2	-	-	-	-	-	28	1	-	-	1933	26	30	29
	98	39	22	6	-	-	-	-	-	-	67	-	-	-	1340	24	31	67
D	85	3	2	5	-	-	-	-	-	-	10	-	-	-	666			10
	91	33	14	1	2	-	-	-	-	-	26	1	2	21	3333			50
	98	28	34	-	1	-	-	-	-	-	42	1	-	20	1260			63
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	1520			76

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	36%	22%	05%	+16%
'91	25%	01%	24%	-56%
'98	45%	04%	14%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	5398	Dec:	12%
	'91	6399		52%
	'98	2840		44%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	6	8	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	40		-

Juniperus osteosperma																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	1	-	-	2	-	-	3	-	-	-	60	-	-	3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	60		-

Opuntia spp.																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	1	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	91	6	-	-	-	-	-	-	-	-	6	-	-	-	400			6
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	15	-	-	-	-	-	-	-	-	15	-	-	-	1000	4	9	15
	91	9	3	-	1	-	-	-	-	-	13	-	-	-	866	5	6	13
	98	3	-	-	-	-	-	-	-	-	3	-	-	-	60	4	6	3
D	85	4	-	-	-	-	-	-	-	-	2	-	2	-	266			4
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	08%	-17%
'91	15%	00%	00%	-94%
'98	00%	00%	25%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	1599	Dec:	17%
	'91	1332		5%
	'98	80		25%

Trend Study 23-3-98

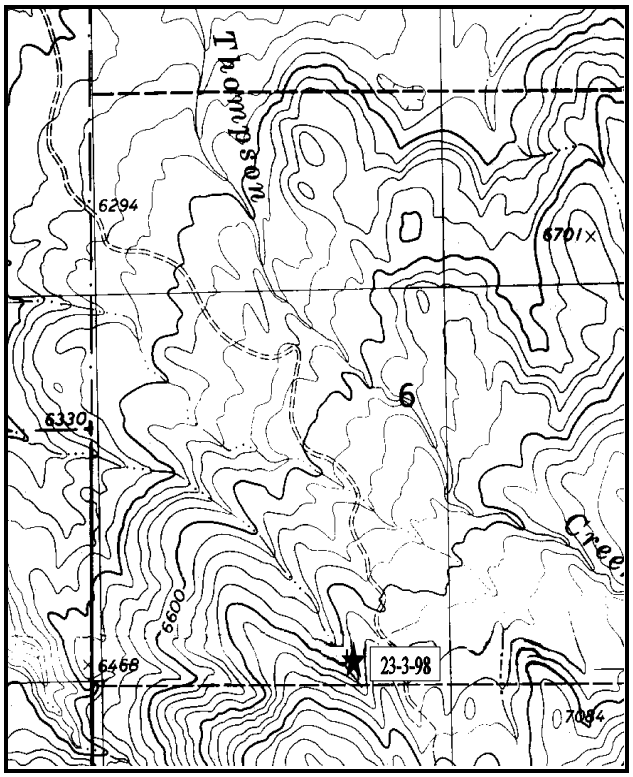
Study site name: Thompson Basin . Range type: Pinyon-Juniper .

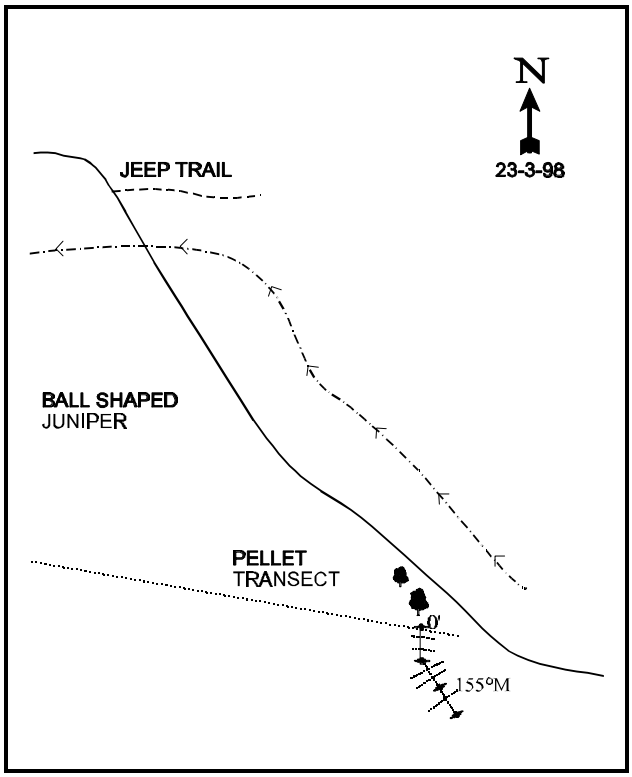
Compass bearing: frequency baseline 180 degrees. (Lines 2 & 3 155°M)

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34 & 71ft), line 3 (59ft).

LOCATION DESCRIPTION

From the Monroe City cemetery, go 3.05 miles north and east to a gravel road on the right. Turn here and go 1.0 miles to the Thompson Basin Road. Turn right and proceed 1.9 miles to a cattleguard. Continue 1.0 mile up the road and stop. There is a witness post on the right side of the road. Fifty feet up the hill, there should be a juniper with the center trunk cut out. The 0-foot baseline stake is on the other side of this tree, approximately 60 feet from the road. The 0-foot stake is a 3/4" rebar tagged #7041.





Map Name: Monroe, Utah Diagrammatic Sketch

Township 25S , Range 2W , Section 6 UTM 4279061.626 N, 407908.913 E

DISCUSSION

Trend Study No. 23-3(45-3)

The Thompson Basin study is located on a steep (53%), juniper covered slope above Thompson Basin. The study has an elevation of 6,800 feet and a east-northeast aspect. An area below the transect was chained about 15 years ago by the Forest Service. Also, a fire had gone through the area approximately 20 years ago. Thompson Basin has been noted historically as a concentration area for deer during the winter. Deer pellet groups are frequently encountered. The pellet transect, which intersects the trend study, indicates a five year average of 80 deer days use/hectare (Jense et al. 1985). The six year average since then was 21 deer days use/hectare (Jense et al. 1991). The pellet group transect read with the vegetative transect (1998) shows 21 deer days use/acre and 12 elk days use/acre. Deer use usually varies considerably from year to year. In the past, the slopes were heavily grazed by both deer and sheep. However, the Forest Service has closed the area to livestock grazing to protect the watershed values.

Ground cover is dominated by large rocks and pavement. Soil textural analysis indicates it to be a sandy clay loam with a neutral to slightly acidic pH (6.6). Effective rooting depth is almost 13 inches, however the site has a relatively high soil temperature of 75°F at 14 inches in depth. The steep slope has a moderate to severe erosion potential. The cover provided by the bunch grasses and the low amount of bare soil helps keep erosion to a minimum. However, there are a few large active gullies on the hillside and in the valley.

The dominant overstory is a mixed mature juniper and pinyon woodland. The older junipers show evidence of highlining, but the younger trees have not been utilized. All are vigorous. There was a high proportion of seedlings and young in the population when it was first read, now they are very few. Currently, there were 99 juniper/acre (average diameter of almost 10 inches) and 72 pinyon/acre (average diameter of about 4 inches) as determined by the point-quarter method. The canopy cover for juniper and pinyon totals 23%. This generally means that this amount of canopy cover will decrease production of the understory by as much as 50%.

Mountain big sagebrush is the principal key browse species, but had only a fair density in 1991 of 1,466 plants/acre. In 1985, the sagebrush appeared vigorous and seemed to be recovering from heavy browsing pressure in the past, especially the hard winter's of 1982-84. The mature plants show light to moderate use of current year's growth. The majority of the plants were classified as mature and decadent. No seedlings were encountered in 1985 or 1991. The percent decadence was at its high of 55% in 1991, currently it is down to 30%. This is still too high for a healthy sagebrush population. Forty-two percent of the population is now dead. It appears that this trend is slowing down, but the trend for the sagebrush population is still down with competition with the juniper and pinyon trees in conjunction with an extended drought through much of 1985 to 1995. Two increasers, pricklypear cactus and stickyleaf low rabbitbrush, are present but do not appear to be increasing very rapidly. Only pricklypear increased since 1985. Some young mountain mahogany are also found near the study site.

Grasses are fairly abundant in the interspaces. Mutton bluegrass is the most abundant, followed by bluebunch wheatgrass, Sandberg bluegrass, and bottlebrush squirreltail. The grasses provide important ground cover, some winter forage and are very valuable in spring as early green forage. Forbs are very sparse, with the more common ones being desert phlox and longleaf phlox.

1985 APPARENT TREND ASSESSMENT

There is some soil movement and erosion from the hillside, but the grass and sagebrush cover aides in infiltration and stabilizes the slope. The slow increase in the density of pinyons and junipers threatens the understory plants and increases erosion potential. The character of the soil and steepness of the slope make chaining unfeasible. However, firewood cutting could be encouraged to maintain open canopy in this area.

1991 TREND ASSESSMENT

The soil appears to be slightly down, with percent bare ground going from 11% up to almost 20%. Most sites have shown this same pattern with the extended drought. The numerous large rocks setting on the soil surface indicate that there has been considerable soil loss in the past. This should be monitored closely because of the steepness of the slope (53%). Mountain big sagebrush has a decreased population of 8% in conjunction with percent decadency going from 33% up to 55%. The percentage of plants that are heavily hedged and classified with poor vigor have also increased. Low rabbitbrush has not increased in numbers since the last inventory. The trend for browse is down. The herbaceous understory has been improving, with almost all nested and quadrat frequency values for both grasses and forbs increasing. In fact, all grasses had increases that were significant from those in 1985.

TREND ASSESSMENT
soil - slightly downward
browse - down
herbaceous understory - up

1998 TREND ASSESSMENT

The trend for soil is stable to slightly up with percent bare soil decreasing down to about 8%. Rock and pavement cover has remained high at almost 57%. Mountain big sagebrush has shown further decreases in its population along with a dead to live ratio of 1:1.4, or about 42% are dead. Percent decadence has decreased, but it is still relatively high at 30%. Trend for the key browse is down because the biotic potential and percent young in the population are still fairly low, not enough to replace the lost plants within the population. Trend for the herbaceous understory is slightly down with nested frequency values for both the grasses and forbs going down.

TREND ASSESSMENT
soil - stable to slightly up
browse - down
herbaceous understory - slightly down for both forbs and grasses

HERBACEOUS TRENDS --
Herd unit 23 , Study no: 3

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Agropyron spicatum	a41	c203	b124	18	79	43	4.71
G	Bromus tectorum (a)	-	-	36	-	-	18	.19
G	Poa fendleriana	a41	b128	c162	15	59	67	6.05
G	Poa secunda	a17	c138	b85	7	57	33	1.00
G	Sitanion hystrix	a4	b43	a1	2	22	1	.00
Total Annual Grasses		0	0	36	0	0	18	0.19
Total Perennial Grasses		103	512	372	42	217	144	11.77
F	Antennaria rosea	1	3	-	1	1	-	-
F	Arabis spp.	-	17	8	-	9	4	.02
F	Castilleja chromosa	-	8	-	-	3	-	-
F	Crepis acuminata	-	5	-	-	3	-	-
F	Erigeron eatonii	-	3	3	-	1	1	.00
F	Erigeron pumilus	3	6	-	1	3	-	-

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
F	Eriogonum racemosum	3	1	3	3	1	1	.03
F	Machaeranthera canescens	5	-	-	3	-	-	-
F	Phlox austromontana	$_{a}$12	$_{b}$52	$_{b}$56	6	24	24	1.24
F	Phlox longifolia	$_{a}$-	$_{b}$59	$_{a}$3	-	24	1	.01
F	Streptanthus cordatus	-	-	1	-	-	1	.00
Total Annual Forbs		0	0	0	0	0	0	0
Total Perennial Forbs		24	154	74	14	69	32	1.31

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 23 , Study no: 3

Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia tridentata vaseyana	40	4.21
B	Chrysothamnus viscidiflorus stenophyllus	0	-
B	Ephedra viridis	0	-
B	Juniperus osteosperma	10	8.44
B	Opuntia spp.	12	.06
B	Pinus edulis	4	4.00
Total for Browse		66	16.72

CANOPY COVER --
Herd unit 23 , Study no: 3

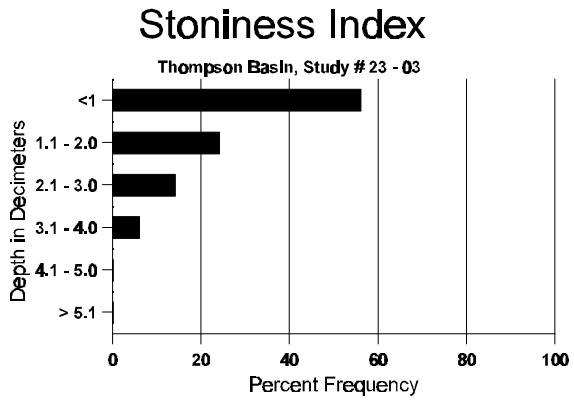
Species	Percent Cover '98
Juniperus osteosperma	17
Pinus edulis	6

BASIC COVER --
Herd unit 23 , Study no: 3

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	296	2.75	6.00	33.60
Rock	276	29.00	24.25	21.23
Pavement	275	18.00	14.25	17.47
Litter	385	38.00	35.50	42.68
Cryptogams	16	1.50	.75	.14
Bare Ground	197	10.75	19.25	8.38

SOIL ANALYSIS DATA --
Herd Unit 23, Study # 03, Study Name: Thompson Basin

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.7	75.0 (13.7)	6.6	54.0	19.4	26.6	2.0	10.5	166.4	.8



PELLET GROUP FREQUENCY --
Herd unit 23 , Study no: 3

Type	Quadrat Frequency '98
Sheep	2
Rabbit	23
Elk	4
Deer	12

BROWSE CHARACTERISTICS --
Herd unit 23 , Study no: 3

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	1	-	-	1	-	-	-	-	-	2	-	-	-	133			2
	98	-	2	-	1	-	-	-	-	-	3	-	-	-	60			3
M	85	6	6	2	-	-	-	-	-	-	13	1	-	-	933	11	21	14
	91	4	3	1	-	-	-	-	-	-	2	5	1	-	533	14	22	8
	98	29	3	-	-	-	-	-	-	-	30	-	2	-	640	20	29	32
D	85	3	5	-	-	-	-	-	-	-	8	-	-	-	533			8
	91	1	8	3	-	-	-	-	-	-	6	-	1	5	800			12
	98	12	2	-	1	-	-	-	-	-	12	-	1	2	300			15
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	720			36

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	46%	08%	00%	- 8%
'91	50%	18%	32%	-32%
'98	14%	00%	10%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	1599	Dec:		33%
'91	1466			55%
'98	1000			30%

Chrysothamnus viscidiflorus stenophyllus																		
M	85	1	1	-	-	-	-	-	-	-	2	-	-	-	133	11	14	2
	91	2	-	-	1	-	-	-	-	-	3	-	-	-	200	11	14	3
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	1	-	-	-	-	-	-	-	-	-	-	1	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	25%	00%	00%	+ 0%
'91	25%	00%	25%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	266	Dec:		50%
'91	266			25%
'98	0			0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Ephedra viridis																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	12	22	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		-
'91	0			-
'98	0			-

Juniperus osteosperma																		
S	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	-	-	1	-	-	-	-	-	2	-	-	-	133			2
	98	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	69	93	1
	91	-	-	-	1	-	-	-	-	-	1	-	-	-	66	118	79	1
	98	2	-	-	3	-	-	-	-	-	5	-	-	-	100	-	-	5
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+67%
'91	00%	00%	00%	+ 1%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	66	Dec:	-
'91	199		-
'98	200		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	2	-	-	1	-	-	-	-	-	3	-	-	-	60			3
M	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133	3	2	2
	91	3	-	-	-	-	-	-	-	-	3	-	-	-	200	4	5	3
	98	12	-	-	-	-	-	-	-	-	12	-	-	-	240	5	10	12
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+34%
'91	00%	00%	00%	+38%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	133	Dec:	0%
	'91	200		0%
	'98	320		6%

Pinus edulis																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	2	-	-	-	-	-	-	1	-	3	-	-	-	60	-	-	3
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	00%	00%	+18%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	66		-
	'98	80		-

Trend Study 23-4-98

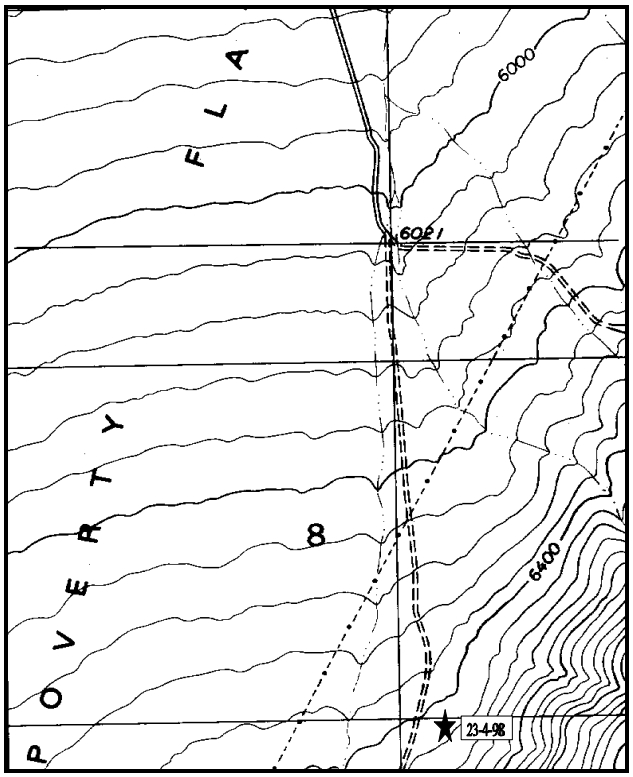
Study site name: Poverty Flat . Range type: Big Sagebrush .

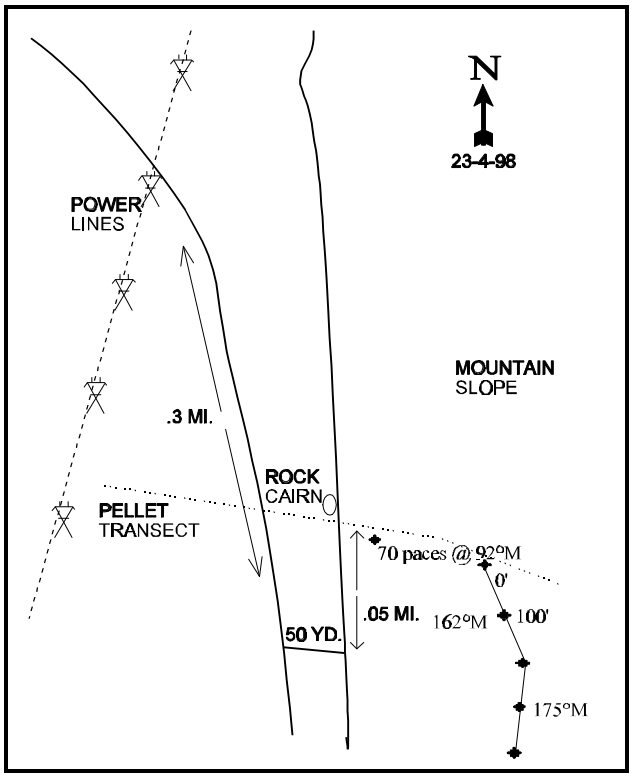
Compass bearing: frequency baseline 162 M degrees. (Line 3 & 4 175°M)

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From 600 South and Main in Monroe, turn southwest on Jones Road, a gravel road coming in at a 45 degree angle (Jones Road). Proceed 3.4 miles to a junction, stay left. Go up this road 1.7 miles to a fork. Stay right, go 0.5 miles and pass under a powerline. Continue 0.3 miles further to a fork, turn left. Go about 50 yards then turn left again. Go another 0.05 miles (about 150 yards) to a witness post ont the east side of the road. Walk upslope to the 5th yellow stake. The frequency baseline begins 12 feet south of the 5th yellow stake east of the road (about 365 feet from road).





Map Name: Monroe, Utah Diagrammatic Sketch

Township 26S , Range 3W , Section 8 UTM 4267140.834 N, 400229.809 E

DISCUSSION

Trend Study No. 23-4 (45-4)

The Poverty Flat study is located on the west side of the Monroe Mountains on the foothills above Poverty Flat, south of Monroe. The hillside study has a slope of about 20%-25%, an elevation of 6,420 feet, and a west aspect. The slope is covered by juniper and Wyoming big sagebrush. When the site was visited in 1998, it was determined that a wildfire had burned through the area in 1997 in which all the key browse was lost. The land is administered by the BLM and is part of a sheep allotment managed as a three pasture rest-rotation system with use allowed from June 1-20 and September 6 through March 31. Apparently, sheep use is more centered on the flat for they graze the hillside where the transect is located only when trailing to and from summer pasture on the forest. Deer use on the study site is moderate to heavy, as evidenced by the numerous pellet groups, hedging and antler drops. Several carcasses were found near the site in both 1985 and 1991, indicating winter losses. A pellet group transect read in conjunction with the vegetative transect indicated deer use at 19 deer days use/acre and elk use at 2 elk days use/acre.

The apparent effective rooting depth (see methods) before hitting solid rock appears moderately shallow at about 11 inches. Rocks are scattered throughout the profile and soil surface. Ground cover is predominately large rocks and pavement, which currently cover over 65% of the ground surface leaving very little actual bare soil. Soil temperature is one of the highest ever measured at 81°F at just over 12 inches in depth. This high of a temperature will be very limiting to the establishment of perennial species after the wildfire. This would allow continued dominance of the site by annuals. There was good litter cover in the past, especially under the sagebrush, but this has been lost to fire. The texture of the soil is a loam with a neutral pH (6.7). The color is brown with low organic matter and low fertility. It is typical of the soils along the foothills in Sevier Valley.

Utah juniper is the dominate overstory, but Wyoming big sagebrush was the most abundant and important browse species until the recent wildfire. The sagebrush had been browsed heavily in the past, and although it appeared healthy, its growth and seed production was below optimum. For now, there are few sagebrush plants within the sampled area. The current density is estimated at only 40 plants/acre. Under these conditions for key browse, it would no longer be considered a winter range for deer. There were a few individuals of undesirable increasers (snakeweed and pricklypear) sampled in previous years, but none were very common. Presently, the density of broom snakeweed has increased to 500 plants/acre, with pricklypear not fairing as well after the fire as none were sampled during 1998. The junipers, generally considered an undesirable increaser on this range type when in relatively high densities, appeared stable and not expanding. Currently, most of these will have been effected by the fire, however this will not be accurately determined until the next reading.

Perennial herbaceous vegetation was sparse in past readings, but with the wildfire and no seeding effort, cheatgrass and other weeds will dominate the site. In the previous two readings, the understory was dominated by annual cheatgrass, but even that species was not plentiful. After the fire, cheatgrass now makes up 86% of the grass cover. There is some bottlebrush squirreltail, Sandberg bluegrass, and Indian ricegrass present, but in very low numbers except for bottlebrush squirreltail which occurs a little more often. Utilization of these perennial grass species in the past was moderate, but it was not apparent whether the use is from wildlife or livestock. Forbs are still rarely found on this site except for coyote tobacco, which invariably comes onto sites that have recently burned. This species is never very competitive and will soon be crowded off the site by other herbaceous species.

1985 APPARENT TREND ASSESSMENT

The soil type is one of severe erosion potential, but is stabilized here by the extensive rock and pavement cover (53%). There is also no evidence of sedimentation. The vegetative community appears to have struck a

balance between the sagebrush and junipers and other increasers. However, if the site is grazed excessively by sheep while trailing in spring and fall, the desirable perennial grasses and sagebrush will decline.

1991 TREND ASSESSMENT

The soil trend is downward because bare soil has increased from only 2% to 11%. Most of this increase has come from a loss of litter cover. This condition should be watched closely, for with more drought, this condition could worsen. Wyoming big sagebrush has increased it's density by 30% with only a slight increase in percent decadency which can change with normal precipitation patterns, rather than this extended drought. It should also be noted that the form class for heavily hedged sagebrush (>60% use) has increased from 8% to 38% with the percent exhibiting poor vigor also increasing from 0% to 31%. Average plant height and crown have also decreased substantially. Even with the increase in it's density, the other measured parameters indicate the health of the community is declining with this prolonged drought. This condition could turn around with an end to the drought. The herbaceous understory is still almost nonexistent except for a few bottlebrush squirreltail.

TREND ASSESSMENT
soil - slightly downward
browse - slightly downward even with the increase in density because the overall health of the sagebrush community is declining
herbaceous understory - downward and very poor condition, few species with very low frequencies

1998 TREND ASSESSMENT

Trend for soil is down. Although percent bare soil has changed little, the fire has changed many other important parameters on the site. The most noticeable is that of protective herbaceous cover and litter cover which has been severely altered. At the present time, 80% of the herbaceous cover comes from only two weedy species becoming more dominant after the fire. Protective litter cover is now down to only 12%, while rock and pavement cover is up to 67%. The trend for browse is obviously down, as 99% of the Wyoming big sagebrush was lost to the fire in 1997. The trend for the herbaceous understory is also down, because without the major two weedy species, total herbaceous cover would be just over 2%, one of the lowest values we have measured.

TREND ASSESSMENT
soil - down
browse - down
herbaceous understory - down

HERBACEOUS TRENDS --
Herd unit 23 , Study no: 4

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Bromus tectorum (a)	-	-	160	-	-	61	9.03
G	Oryzopsis hymenoides	4	-	1	2	-	1	.03
G	Poa secunda	7	7	5	2	3	2	.18
G	Sitanion hystrix	$_{b}$77	$_{a}$48	$_{ab}$60	39	23	27	1.24
Total Annual Grasses		0	0	160	0	0	61	9.03
Total Perennial Grasses		88	55	66	43	26	30	1.45
F	Argemone munita	-	-	2	-	-	1	.15
F	Astragalus spp.	1	-	-	1	-	-	-
F	Calochortus nuttallii	-	-	1	-	-	1	.00
F	Castilleja spp.	-	-	1	-	-	1	.00
F	Descurainia spp. (a)	-	-	4	-	-	2	.04
F	Erigeron pumilus	1	3	-	1	1	-	-
F	Euphorbia spp.	$_{a}$-	$_{a}$-	$_{b}$5	-	-	4	.04
F	Lappula occidentalis (a)	-	-	4	-	-	2	.01
F	Leucelene ericoides	$_{a}$-	$_{a}$-	$_{b}$15	-	-	8	.33
F	Lupinus argenteus	-	-	3	-	-	1	.15
F	Nicotiana attenuata (a)	-	-	3	-	-	3	1.06
F	Sisymbrium altissimum (a)	-	1	-	-	1	-	-
F	Unknown forb-perennial	-	-	-	-	-	-	.38
Total Annual Forbs		0	1	11	0	1	7	1.11
Total Perennial Forbs		2	3	27	2	1	16	1.07

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 23 , Study no: 4

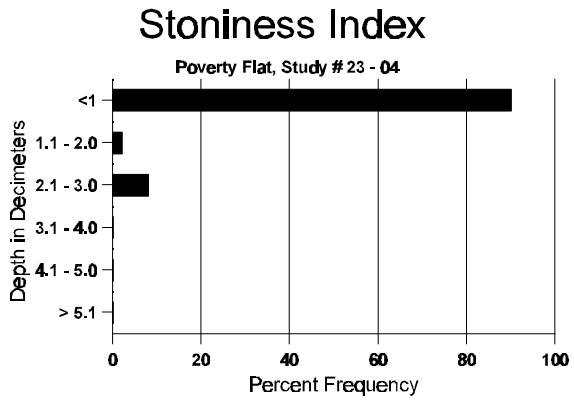
Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia tridentata wyomingensis	2	-
B	Echinocereus spp.	0	-
B	Gutierrezia sarothrae	10	.16
B	Juniperus osteosperma	0	.63
B	Opuntia spp.	0	-
Total for Browse		12	0.79

BASIC COVER --
Herd unit 23 , Study no: 4

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	208	3.25	2.75	14.86
Rock	366	28.75	25.25	48.72
Pavement	227	24.00	28.00	18.13
Litter	315	41.50	33.25	11.90
Cryptogams	7	.25	0	.06
Bare Ground	221	2.25	10.75	9.93

SOIL ANALYSIS DATA --
Herd Unit 23, Study # 04, Study Name: Poverty Flat

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.1	81.0 (12.6)	6.7	44.0	35.4	20.6	4.8	26.2	163.2	.8



PELLET GROUP FREQUENCY --
Herd unit 23 , Study no: 4

Type	Quadrat Frequency '98
Elk	1
Deer	3

BROWSE CHARACTERISTICS --
Herd unit 23 , Study no: 4

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	85	6	2	-	-	-	-	-	-	-	8	-	-	-	533			8
	91	11	-	-	-	-	-	-	-	-	10	-	1	-	733			11
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	10	6	1	-	-	-	-	-	-	17	-	-	-	1133			17
	91	10	1	6	-	-	-	-	-	-	16	-	1	-	1133			17
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	14	31	3	-	-	-	-	-	-	48	-	-	-	3200	20	23	48
	91	9	21	21	-	6	3	-	-	-	42	1	17	-	4000	15	17	60
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	85	3	10	3	-	-	-	-	-	-	16	-	-	-	1066			16
	91	4	14	15	1	2	3	-	-	-	18	1	11	9	2600			39
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	660			33

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	58%	09%	00%	+30%
'91	38%	41%	33%	-99%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	5399	Dec:		20%
'91	7733			34%
'98	40			50%

Echinocereus spp.

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	5	6	1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		-
'91	66			-
'98	0			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	9	-	-	-	-	-	-	-	-	9	-	-	-	180			9
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	16	-	-	-	-	-	-	-	-	16	-	-	-	320	10	13	16
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	500		-

Juniperus osteosperma																		
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	0		-

Opuntia spp.																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200	6	10	3
	91	1	-	-	-	-	-	2	-	-	3	-	-	-	200	6	13	3
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+40%
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	200	Dec:	-
	'91	333		-
	'98	0		-

Trend Study 23-5-98

Study site name: Smith Canyon . Range type: Big Sagebrush-Grass .

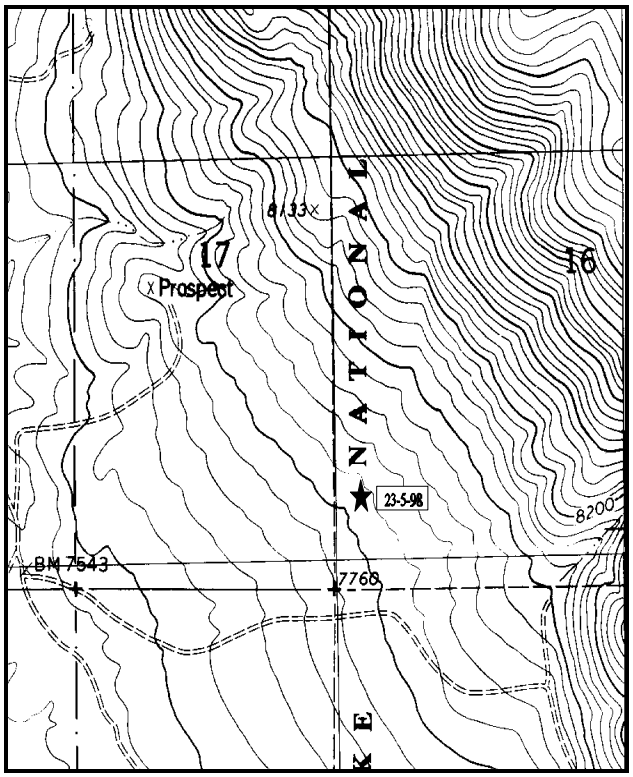
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

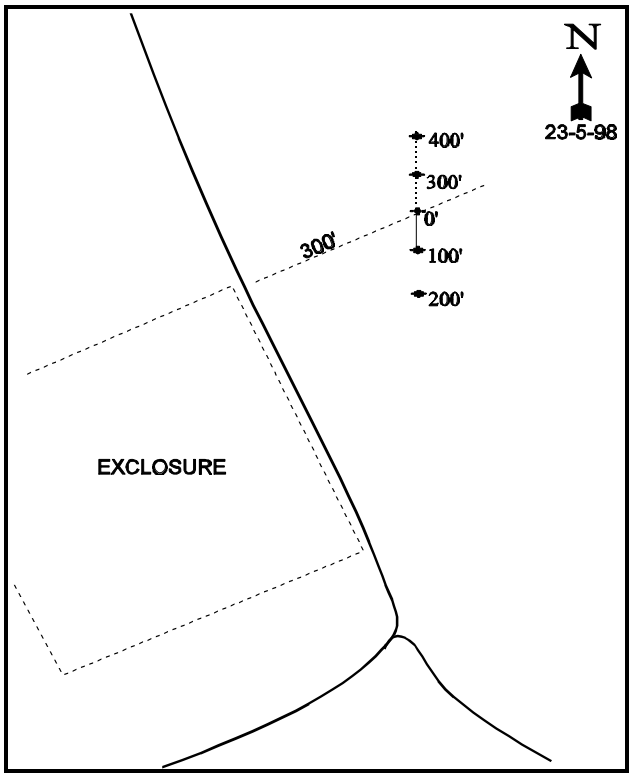
LOCATION DESCRIPTION

From the intersection of Main Street (SR89) and Center Street in Marysvale, turn east and proceed 0.7 miles, crossing a bridge. At a three-way split in the road stay left and continue 1.9 miles. Keep right and go 0.8 miles. Keep right at the split, then go immediately right again. Proceed another 0.8 miles and make a left turn. Go 2.5 miles up this road to a "T" intersection. Turn right and go 0.8 miles to the Smith Canyon sign. Turn left here and drive 0.7 miles, passing through a gate. Turn north (left) and go along the east side of a cattle exclosure. From the northeast corner of the exclosure, walk 300 feet at 70 degrees (in line with the north side fence) to the start of the baseline. The 0-foot end is marked by a rebar with a browse tag #7043 attached.

Map Name: Marysvale, Utah



Diagrammatic Sketch



Township 27S , Range 2.5W , Section 16 UTM 4257083.229 N, 401194.169 E

DISCUSSION

Trend Study No. 23-5 (45-5)

The Smith Canyon trend study is located on the southwestern side of Marysvale Peak, at an elevation of about 7,800 feet. The foothills level out to form open, gentle sagebrush covered slopes (about 2-3% slope). Much of the area has been chained and seeded, and now there are scattered junipers, clumps of Gambel oak, and curlleaf mountain mahogany. An adjacent cattle exclosure displays similar vegetation, but the plants there appear slightly more vigorous. Grazing pressure from livestock appears light on this Forest Service land. Browsing pressure is often heavy at times. The Smith Canyon pellet group transect shows more use than any other transect on the herd unit with a 10-year average of over 41 deer days use/acre (Jense et al. 1985). From 1985 through 1990, average deer days use/hectare was up to 62 deer days use/acre. Although use is concentrated in winter, tracks and sightings indicate deer use is common year-round. Elk have been seen in the area and if the herd continues to increase, this may become an important elk wintering area as well. The pellet group transect read in conjunction with the vegetative transect indicated that deer days use/acre was up to 112, while for cows it was 14 cow days use/acre.

The soil appears to be well-developed and protected on this site. Litter cover is moderately high from the diverse and healthy plant community. Soil textural analysis indicates it to be a sandy loam with a moderately acidic pH (5.9). Effective rooting depth is almost 12 inches with a soil temperature of 60°F at 13 inches. There is a relatively dense cover of vegetation over much of the transect, leaving very little bare soil. Pavement occupies much of the space between vegetation. The area receives more precipitation than the other winter range study sites on this herd unit. Erosion could be severe on this soil type, but the ground cover and gentle slope tend to minimize the problem.

Mountain big sagebrush is the dominant shrub species as it makes up 80% of the browse cover. The subspecies *Artemisia tridentata vaseyana* is considered a very palatable sagebrush, yet it is not as utilized as the bitterbrush on this site. The sagebrush population shows a relatively large decrease in numbers from 1991 to 1998, however only about 25% of this decrease can be explained by the number of dead plants in the population. Therefore, most of the decrease is because of the much larger sampling design giving greater accuracy in estimating shrub populations that are discontinuous and/or clumped in their distributions. Currently, the sagebrush have a decrease in percent decadence, and those classified with poor vigor have decreased, but use is still moderate with no seedlings, and percent young are a very minor component (only 4%). The live to dead ratio is moderately high at 1:4.6, or 18%. The mature age class now makes up almost 80% of the population. The sagebrush shows mostly moderate hedging (from 46% to 54%), whereas bitterbrush currently has sustained heavier use, but still has a lower percentage of decadence. All the plants are large and generally in good vigor. However in 1985, leader growth on the bitterbrush appeared to be somewhat less than optimum and were probably effected by the heavy hedging during the winters of 1983 and 1984. Even with heavy use the bitterbrush has only 8% classified as decadent plants. Nineteen percent of the bitterbrush were young plants in 1985. This had gone down to only 5% in 1991. Now it is back up to 15%. Juniper, Gambel oak, and mountain mahogany are abundant nearby and appear to be spreading slowly. These trees provide the only good escape and thermal cover in the area.

Grasses include six perennial species, which are growing well and are fairly abundant, especially under the shrub crowns. The most common perennial species is bluebunch wheatgrass. Other species that commonly occur are muttongrass and bottlebrush squirreltail. Cheatgrass was present, but made up only a small percentage of the vegetation initially. Cheatgrass now contributes 68% of the grass cover and grass species make up 86% of the herbaceous cover. Utilization of grasses is generally light. Currently, the nest frequency value for the perennial grasses has gone down to its lowest value since 1985. The value for forbs has also gone down to its lowest value since the first measurements. Trend is down for the herbaceous understory.

There is good diversity of valuable perennial forbs on the site, but they are not very common. The most abundant is silky lupine, which grows tall and vigorous. Other useful forbs include: arrowleaf balsamroot,

redroot eriogonum, mulesears wyethia, and tapertip hawksbeard. Density is rather low and most of these plants are small and low-growing, but they are utilized by wildlife.

1985 APPARENT TREND ASSESSMENT

As this is such a heavily used and important winter range, it is vital to monitor the community to help prevent severe downward trends. Continued heavy use in conjunction with the drought could be detrimental to the bitterbrush population. Light spring cattle grazing or elk use can help to release young browse plants from grass competition, especially here where the grasses grow thick under the cover of the sagebrush. As the junipers and oaks increase, they will provide excellent cover, but a continuous stand would not be desirable. Generally, vegetative trend appears stable, or slightly downward because of the heavy pressure on the bitterbrush. The soil is stable and in good condition.

1991 TREND ASSESSMENT

Here again, as on other sites, percent bare ground has increased from 4 to 11% and vegetative basal cover has decreased from 8% to 4%. The common denominator appears to be the prolonged drought. This downward trend should be watched closely, but should improve with improved precipitation patterns. The two key browse species, mountain big sagebrush and bitterbrush, are both increasing in density, 16% and 20% respectively. Percent decadence has gone down in sagebrush, but has gone up sharply for bitterbrush. The increase for bitterbrush could be a combination of heavy use and again the extended drought. Even with the increase in decadence, the browse trend is still considered to be improving. With increased moisture, the degree of decadency for bitterbrush would be expected to go down. The herbaceous understory is also on an upward trend, with most of the grasses and forbs increasing in quadrat frequency.

TREND ASSESSMENT
soil - slightly down
browse - slightly up
herbaceous understory - up

1998 TREND ASSESSMENT

The trend for soil is slightly down because of significant decreases in grass and forb nested frequency values which are the lowest they have ever been. The browse trend is mixed, with a slight downward trend for sagebrush and a stable trend for bitterbrush. However, since sagebrush contributes 80% of the browse cover, trend would be slightly down. The trend for the herbaceous understory is also slightly down, because nested frequency values for both have significantly decreased since 1991.

TREND ASSESSMENT
soil - slightly down
browse - slightly down
herbaceous understory - slightly down

HERBACEOUS TRENDS --
Herd unit 23 , Study no: 5

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Agropyron spicatum	179	176	195	71	68	74	4.20
G	Bromus tectorum (a)	-	-	305	-	-	92	10.56
G	Hilaria jamesii	-	-	3	-	-	1	.15
G	Poa fendleriana	$_{b}$58	$_{a}$78	$_{b}$28	28	35	15	.25
G	Poa secunda	-	-	6	-	-	2	.01
G	Sitanion hystrix	$_{a}$47	$_{b}$64	$_{a}$28	24	35	14	.22
G	Stipa comata	-	4	5	-	1	2	.18
Total Annual Grasses		0	0	305	0	0	92	10.56
Total Perennial Grasses		284	322	265	123	139	108	5.03
F	Agoseris glauca	$_{a}$-	$_{b}$6	$_{a}$-	-	4	-	.00
F	Alyssum alyssoides (a)	-	-	3	-	-	1	.00
F	Arabis spp.	-	4	3	-	3	1	.00
F	Astragalus convallarius	17	6	9	7	4	5	.19
F	Astragalus spp.	-	12	3	-	4	2	.01
F	Balsamorhiza sagittata	-	5	2	-	2	1	.01
F	Calochortus nuttallii	$_{a}$-	$_{b}$9	$_{a}$1	-	6	1	.00
F	Chaenactis douglasii	-	-	5	-	-	2	.01
F	Comandra pallida	5	5	1	3	2	1	.03
F	Collinsia parviflora (a)	-	-	2	-	-	1	.00
F	Crepis acuminata	$_{ab}$4	$_{b}$14	$_{a}$-	3	7	-	-
F	Cryptantha nana	3	-	-	2	-	-	-
F	Eriogonum racemosum	$_{a}$20	$_{b}$59	$_{a}$21	11	27	9	.29
F	Eriogonum umbellatum	-	-	3	-	-	1	.00
F	Lonicera utahensis	$_{a}$-	$_{a}$-	$_{b}$16	-	-	6	.30
F	Lotus utahensis	-	1	-	-	1	-	-
F	Lupinus argenteus	$_{c}$74	$_{b}$46	$_{a}$18	31	23	8	1.55
F	Microsteris gracilis (a)	-	-	11	-	-	4	.02
F	Phlox longifolia	$_{b}$42	$_{b}$50	$_{a}$21	19	28	11	.11
F	Sphaeralcea coccinea	-	3	-	-	1	-	-
F	Streptanthus cordatus	4	2	1	2	1	1	.00
F	Wyethia amplexicaulis	$_{b}$11	$_{a}$-	$_{a}$-	5	-	-	-
Total Annual Forbs		0	0	16	0	0	6	0.02
Total Perennial Forbs		180	222	104	83	113	49	2.54

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 23 , Study no: 5

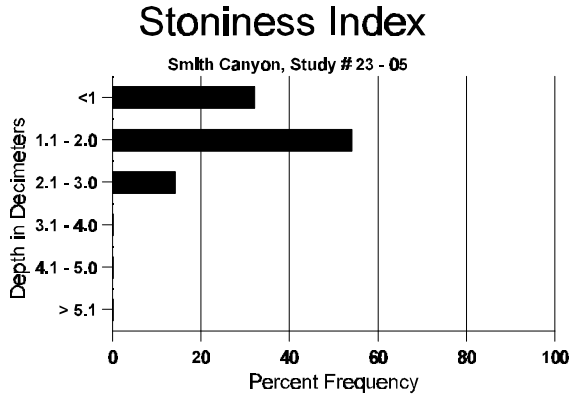
Type	Species	Strip Frequency '98	Average Cover % '98
B	Amelanchier utahensis	0	-
B	Artemisia tridentata vaseyana	88	24.61
B	Chrysothamnus nauseosus albicaulis	1	-
B	Chrysothamnus viscidiflorus viscidiflorus	2	-
B	Eriogonum microthecum	2	-
B	Opuntia spp.	0	-
B	Pinus edulis	1	-
B	Purshia tridentata	44	6.61
B	Sclerocactus	2	-
B	Symphoricarpos oreophilus	1	-
B	Tetradymia canescens	0	-
Total for Browse		141	31.22

BASIC COVER --
Herd unit 23 , Study no: 5

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	344	8.00	4.25	40.73
Rock	130	1.00	1.25	2.75
Pavement	234	18.50	8.75	12.96
Litter	394	68.25	73.25	54.14
Cryptogams	9	.75	1.25	.12
Bare Ground	194	3.50	11.25	13.71

SOIL ANALYSIS DATA --
Herd Unit 23, Study # 05, Study Name: Smith Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.9	59.6 (13.3)	5.9	54.0	29.4	16.6	3.5	21.9	281.6	.4



PELLET GROUP FREQUENCY --
Herd unit 23 , Study no: 5

Type	Quadrat Frequency '98
Rabbit	26
Deer	34
Cattle	3

BROWSE CHARACTERISTICS --
Herd unit 23 , Study no: 5

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier utahensis																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	24	17	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'98	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	6	4	-	-	-	-	-	-	-	10	-	-	-	666			10
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	98	4	1	-	1	1	-	-	-	-	7	-	-	-	140			7
M	85	22	29	6	-	-	-	-	-	-	49	-	8	-	3800	24	27	57
	91	34	38	1	4	3	2	-	-	-	74	3	5	-	5466	22	30	82
	98	70	72	9	1	-	-	-	-	-	148	2	2	-	3040	32	44	152
D	85	4	16	4	-	-	-	-	-	-	18	-	4	2	1600			24
	91	11	12	-	-	1	-	-	-	-	16	-	1	7	1600			24
	98	15	14	4	-	-	1	-	-	-	27	-	-	7	680			34
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	840			42

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	54%	11%	15%	+16%
'91	50%	03%	12%	-46%
'98	46%	07%	05%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	6066	Dec:		26%
'91	7199			22%
'98	3860			18%

Chrysothamnus nauseosus albicaulis

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		0%
'91	0			0%
'98	20			100%

Chrysothamnus viscidiflorus viscidiflorus

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	1	-	-	-	2	-	-	-	40	-	-	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	50%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		-
'91	0			-
'98	40			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Eriogonum microthecum																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	98	-	-	-	2	-	-	-	-	-	2	-	-	-	40			2
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	1	-	-	-	-	-	-	1	-	-	-	66	1	2	1
	98	-	-	1	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	33%	00%	-70%
'98	00%	33%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		-
'91	199			-
'98	60			-

Opuntia spp.																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	5	11	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		-
'91	0			-
'98	0			-

Pinus edulis																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		-
'91	0			-
'98	20			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
S	85	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	-	3	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	-	-	-	-	-	1	-	-	-	1	-	-	-	66			1
	98	-	2	3	-	3	1	-	-	-	9	-	-	-	180			9
M	85	-	8	5	-	-	-	-	-	-	13	-	-	-	866	20	27	13
	91	-	3	5	-	-	-	-	-	-	8	-	-	-	533	13	20	8
	98	-	1	22	3	10	10	1	-	-	47	-	-	-	940	20	37	47
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	-	9	-	-	1	-	-	-	11	-	-	-	733			11
	98	-	-	5	-	-	-	-	-	-	5	-	-	-	100			5
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	120			6

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	69%	31%	00%	+20%
'91	15%	80%	00%	- 8%
'98	26%	67%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	1066	Dec:		0%
'91	1332			55%
'98	1220			8%

Sclerocactus																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	3	-	-	-	-	-	-	3	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	75%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		0%
'91	0			0%
'98	80			75%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Symphoricarpos oreophilus																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	1	-	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	13	28	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	100%	00%	-70%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	66		-
	'98	20		-

Tetradymia canescens																		
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	133	Dec:	-
	'91	0		-
	'98	0		-

Trend Study 23-6-98

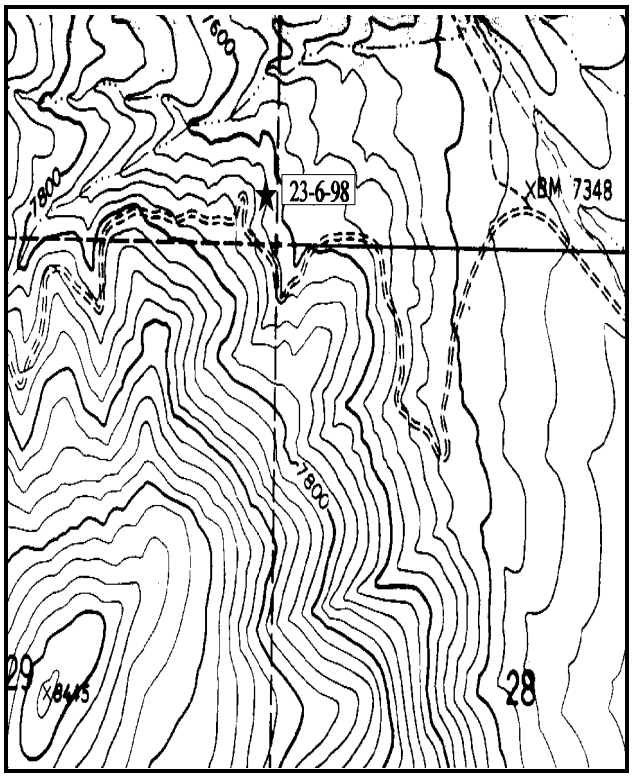
Study site name: Koosharem Canyon . Range type: Mixed Mountain Brush .

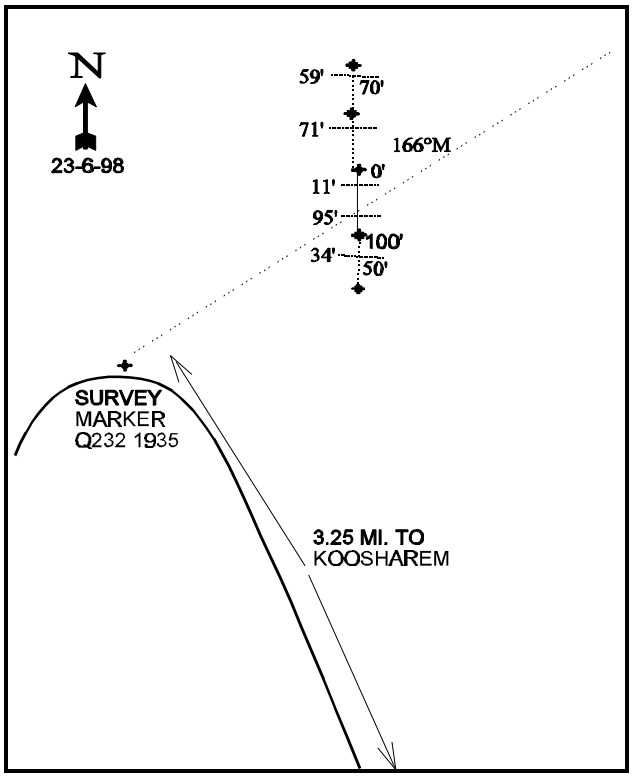
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (71ft), line 4 (59ft).

LOCATION DESCRIPTION

From the intersection next to the Koosharem LDS Ward Building go west 0.35 miles up the Koosharem Mountain Road. Bear right and go 0.05 miles to a fork. Take the left fork over a small bridge and proceed 1.85 miles to another fork. Turn left and go just over 1.0 mile to a hairpin turn that curves to the left. Stop at the apex of the curve. There is a benchmark here on the north side of the road. Take a bearing of 39 degrees and go 58 feet from the benchmark to find a short yellow rebar that marks a pellet group transect. From the first stake, the pellet group transect runs northeast (62-67 degrees) with stakes at intervals of about 50-60 feet. Count down 7 stakes, then go due north 50 feet to the baseline starting point. The 0-foot end of the baseline is marked by a steel rebar with browse tag #7042 attached. The baseline runs due south, crossing the pellet group transect.





Map Name: Koosharem, Utah Diagrammatic Sketch

Township 26S , Range 1W , Section 20 UTM 4264699.016 N, 419545.308 E

DISCUSSION

Trend Study No. 23-6 (45-6)

The Koosharem Canyon study samples a moderately high elevation winter range on the east side of the Monroe Mountain herd unit. The site is located on a northeast, moderately steep slope (28%) at an elevation of 7,600 feet. The range type is mixed mountain brush with 10 browse species present. Wildlife use appears to be year- round. Data from pellet group counts on the site show an average over the last five years of 22 deer days use/acre (Jense et al. 1985). After this period, the deer days use/acre had gone up to 57 (Jense et al. 1991). Currently, the transect read in conjunction with the vegetation transect showed that deer days use/acre is now up to 63. Elk use is at 31 elk days use/acre and cattle at 5 days use/acre. Cattle graze this Forest Service land from June 1 to July 1. Under the current system, it is grazed two years in a row, then rested two years. Past grazing pressure appears to have been very heavy.

Ground cover is highly variable on the site. The vegetation and litter cover provides the majority of the ground cover. Soil movement is detectable on trails and shrub interspaces where rocks and pavement (24% of ground cover) and bare soil (24%) predominant. The soil is prone to erosion, as seen on some steeper areas nearby. The soil is rocky, but also contains a fair amount of organic matter. Soil textural analysis indicated that it was a clay loam with a neutral to slightly acidic pH (6.5). Effective rooting depth was moderate at just over 16 inches with a soil temperature of 59^{o}F at 17 inches.

The hillside is dominated mainly by Wyoming big sagebrush and true mountain mahogany (*Cercocarpus montanus*). These two species alone contribute to 82% of the browse cover. Further up the hill and to the south, large mature Utah juniper and curlleaf mountain mahogany (*Cercocarpus ledifolius*) are more prominent. Both the sagebrush and the true mountain mahogany were initially vigorous and all available. There were a few decadent and less vigorous individuals, but both species had a healthy percentage of seedlings and young in 1985. Since then, mountain big sagebrush has shown many characteristics indicating a downward trend. These include: very low biotic potential, low percentage of plants in the young age class, high percent decadence (65% in 1991, currently 26%), and a high percentage of decadent plants classified as dying (43% in 1991). The downward trend for sagebrush has slowed down, but it is still going down. The large decrease in density for sagebrush is mostly because of the much larger sample size giving more accurate density estimates of shrub populations that have discontinuous and/or clumped distributions. Also, only about 21% of the drop in numbers can be explained by the number of dead in the population. True mountain mahogany, a long-lived species, is stable to slightly up. The oak and several other important browse species; Utah serviceberry, snowberry and Greenes rabbitbrush, show signs of light browsing. Pricklypear cactus, an increaser under cattle grazing, is fairly common but does not appear to be increasing rapidly.

Herbaceous vegetation is moderately abundant. The most abundant species except for mutton grass is sedge (*Carex spp.*) Muttongrass and bottlebrush squirreltail make up the balance of the most abundant grasses. These grass and grass-like species provide some spring and summer forage, but the community is lacking a desirable high-yielding herbaceous species. Bluebunch wheatgrass could fill this need, but it is presently in very low numbers and may not increase if spring cattle grazing continues at present levels. The perennial grass sum of nested frequency has decreased substantially since 1991.

There are a variety of forbs on the site, but density is very low and most are small and low-growing. Thus they are only a minor forage source. Some of the more common species that are utilized by deer are: longleaf phlox, scarlet globemallow, clover, dusty penstemon, and sulphur eriogonum. Utilization of these forbs appears to be light.

1985 APPARENT TREND ASSESSMENT

Soil trend on the site appears to be slightly downward as erosion continues on localized areas of the slope. An increase in basal vegetative cover from new growth of the grasses and forbs will help hold the soil in place. There does appear to be an increase in the grasses as they recover from past heavy grazing pressure. The key species may also be increasing; both the sagebrush and mountain mahogany have a high percentage of young plants. The upward vegetative trend is also shown by the good form, vigor and leader growth of the important browse species. However, encroachment of Gambel oak could become a problem in the future.

1991 TREND ASSESSMENT

The soil trend is considered slightly down because vegetative basal cover is down and percent bare ground is up to 29% . Serviceberry, mountain big sagebrush, and True mountain mahogany are all decreasing in density and increasing in rates of decadency. This would indicate a downward trend that should be watched closely. The majority of the grasses and forbs have shown increases in nested and quadrat frequency values, indicating an upward overall trend for the herbaceous understory.

TREND ASSESSMENT
soil - slightly down
browse - down
herbaceous understory - up

1998 TREND ASSESSMENT

The soil trend is considered stable with a slight decrease in percent bare soil with a corresponding decrease in herbaceous cover, essentially canceling out each trend. Trend for key browse is mixed, but because mountain big sagebrush contributes the majority of the browse cover (about 60%), it is still showing some indications of downward trend. Therefor, trend for browse is slightly down. The trend for herbaceous species is down, with nested frequency values for both grasses and forbs.

TREND ASSESSMENT
soil - stable
browse - slightly down for sagebrush
herbaceous understory - down for both the grasses and forbs

HERBACEOUS TRENDS --
Herd unit 23 , Study no: 6

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Agropyron smithii	a-	b24	a5	-	12	2	.03
G	Agropyron spicatum	a10	b49	a32	6	24	14	.83
G	Bouteloua gracilis	-	-	2	-	-	1	.00
G	Carex spp.	c221	b179	a109	81	63	39	2.02
G	Oryzopsis hymenoides	-	8	18	-	3	7	.70
G	Poa fendleriana	b176	c183	a138	75	68	53	8.00
G	Sitanion hystrix	a58	b110	a56	24	46	25	.98
Total Annual Grasses		0	0	0	0	0	0	0
Total Perennial Grasses		465	553	360	186	216	141	12.58

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
F	Agoseris glauca	-	6	-	-	2	-	-
F	Antennaria rosea	1	3	-	1	1	-	-
F	Androsace septentrionalis (a)	-	-	14	-	-	8	.06
F	Arabis spp.	-	-	3	-	-	1	.00
F	Astragalus lentiginosus	6	7	5	4	3	2	.03
F	Castilleja chromosa	$_{a}$-	$_{b}$16	$_{a}$-	-	6	-	-
F	Calochortus nuttallii	$_{a}$-	$_{b}$17	$_{a}$-	-	9	-	-
F	Crepis acuminata	$_{ab}$3	$_{b}$13	$_{a}$-	2	6	-	-
F	Cryptantha humilis	4	5	1	3	3	1	.03
F	Descurainia spp. (a)	-	-	2	-	-	1	.00
F	Erigeron eatonii	5	3	-	3	2	-	-
F	Eriogonum racemosum	-	-	4	-	-	2	.03
F	Eriogonum umbellatum	$_{a}$5	$_{b}$16	$_{a}$3	3	9	1	.03
F	Lomatium spp.	$_{a}$-	$_{b}$12	$_{a}$-	-	6	-	-
F	Machaeranthera canescens	5	-	-	2	-	-	-
F	Penstemon comarrhenus	6	-	-	3	-	-	-
F	Penstemon spp.	$_{a}$-	$_{a}$-	$_{b}$8	-	-	4	.04
F	Penstemon watsonii	-	2	-	-	2	-	-
F	Phlox longifolia	$_{b}$40	$_{c}$69	$_{a}$7	19	34	3	.01
F	Potentilla gracilis	-	-	1	-	-	1	.03
F	Sphaeralcea coccinea	$_{b}$28	$_{ab}$17	$_{a}$5	13	8	3	.04
F	Taraxacum officinale	1	-	-	1	-	-	-
F	Tragopogon dubius	-	-	1	-	-	1	.00
F	Trifolium spp.	$_{b}$21	$_{c}$37	$_{a}$2	11	19	1	.00
F	Unknown forb-perennial	5	-	-	3	-	-	-
F	Wyethia amplexicaulis	5	-	-	2	-	-	-
F	Zigadenus paniculatus	2	-	-	2	-	-	-
Total Annual Forbs		0	0	16	0	0	9	0.06
Total Perennial Forbs		137	223	40	72	110	20	0.28

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 23 , Study no: 6

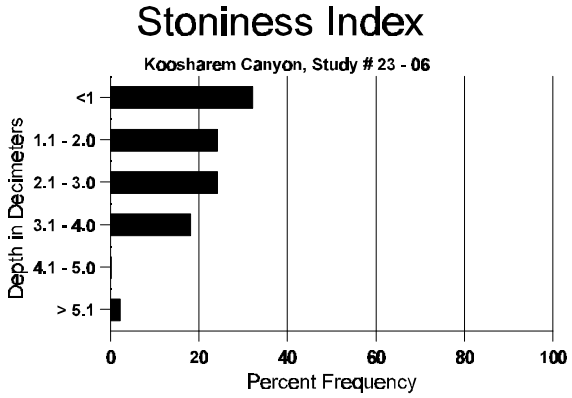
Type	Species	Strip Frequency '98	Average Cover % '98
B	Amelanchier utahensis	10	.36
B	Artemisia tridentata wyomingensis	91	17.00
B	Cercocarpus ledifolius	1	-
B	Cercocarpus montanus	44	6.59
B	Chrysothamnus depressus	5	.33
B	Chrysothamnus greenei	0	-
B	Chrysothamnus viscidiflorus viscidiflorus	6	.03
B	Cowania mexicana stansburiana	1	.15
B	Echinocereus spp.	2	.01
B	Eriogonum microthecum	15	.42
B	Juniperus osteosperma	3	.00
B	Mahonia repens	1	-
B	Opuntia spp.	21	.23
B	Pinus edulis	3	.18
B	Purshia tridentata	8	.16
B	Quercus gambelii	11	1.54
B	Symphoricarpos oreophilus	31	1.77
Total for Browse		152	28.80

BASIC COVER --
Herd unit 23 , Study no: 6

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	299	9.25	5.25	37.37
Rock	191	11.25	10.25	9.54
Pavement	256	13.00	7.75	14.62
Litter	392	49.00	47.25	47.14
Cryptogams	1	0	.25	.00
Bare Ground	270	17.50	29.25	23.75

SOIL ANALYSIS DATA --
Herd Unit 23, Study # 06, Study Name: Koosharem Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
16.2	58.6 (17.1)	6.5	40.0	25.4	34.6	4.2	26.8	243.2	.6



PELLET GROUP FREQUENCY --
Herd unit 23 , Study no: 6

Type	Quadrat Frequency '98
Rabbit	50
Elk	10
Deer	45
Cattle	1

BROWSE CHARACTERISTICS --
Herd unit 23 , Study no: 6

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier utahensis																		
S	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	6	2	-	-	-	-	-	-	-	8	-	-	-	533			8
	91	-	-	2	-	-	-	2	-	-	4	-	-	-	266			4
	98	2	-	-	2	-	-	-	-	-	4	-	-	-	80			4
M	85	-	1	-	-	-	-	-	-	-	1	-	-	-	66	13	9	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	2	1	-	3	2	-	-	-	-	8	-	-	-	160	25	21	8
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	1	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	33%	00%	00%	-45%
'91	00%	60%	00%	-28%
'98	25%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	599	Dec:	0%
	'91	332		20%
	'98	240		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	85	16	-	-	-	-	-	-	-	-	16	-	-	-	1066			16
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	3	-	-	-	-	-	-	-	-	2	-	1	-	60			3
Y	85	39	6	1	-	-	-	-	-	-	42	-	4	-	3066			46
	91	1	3	-	-	-	-	4	-	-	8	-	-	-	533			8
	98	8	5	-	3	-	-	-	-	-	15	-	1	-	320			16
M	85	25	19	-	-	-	-	-	-	-	43	-	1	-	2933	39	33	44
	91	4	9	-	4	4	1	-	-	-	20	1	1	-	1466	31	26	22
	98	65	33	2	2	6	-	-	-	-	109	1	-	-	2200	29	31	110
D	85	6	17	1	-	-	-	-	-	-	22	-	2	-	1600			24
	91	13	21	4	3	11	-	4	-	-	29	1	2	24	3733			56
	98	21	12	9	2	1	-	-	-	-	42	-	1	2	900			45
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	480			24

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	37%	02%	06%	-25%
'91	56%	06%	31%	-40%
'98	33%	06%	02%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	7599	Dec:	21%
	'91	5732		65%
	'98	3420		26%

Cercocarpus ledifolius																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	1	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	100%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Cercocarpus montanus																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	6	4	-	-	-	-	-	-	-	10	-	-	-	666			10
	91	-	1	-	-	1	2	1	-	-	5	-	-	-	333			5
	98	3	2	-	4	-	-	-	-	-	9	-	-	-	180			9
M	85	3	3	-	-	-	-	-	-	-	6	-	-	-	400	34	19	6
	91	-	-	3	-	1	1	-	-	-	5	-	-	-	333	49	21	5
	98	10	23	14	-	4	-	-	-	-	50	1	-	-	1020	36	40	51
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	4	2	-	-	-	-	-	-	5	-	-	1	120			6
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	44%	00%	00%	-38%
'91	30%	60%	00%	+50%
'98	50%	24%	02%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	1066	Dec:	0%
	'91	666		0%
	'98	1320		9%

Chrysothamnus depressus																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	3	5	-	-	-	-	-	-	-	8	-	-	-	160	3	10	8

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	63%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	160		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus greenei																		
Y	85	10	-	-	-	-	-	-	-	-	10	-	-	-	666			10
	91	-	-	1	-	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	14	-	-	-	-	-	-	-	-	14	-	-	-	933	5	5	14
	91	-	-	2	-	-	-	-	-	-	2	-	-	-	133	2	3	2
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	18	-	-	-	-	-	-	18	-	-	-	1200			18
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	-13%
'91	00%	100%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	1599	Dec:	0%
	'91	1399		86%
	'98	0		0%

Chrysothamnus viscidiflorus viscidiflorus																		
S	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133	10	7	2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	2	-	-	4	-	-	-	-	-	6	-	-	-	120	15	14	6
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	14%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	266	Dec:	0%
	'91	0		0%
	'98	140		14%

Cowania mexicana stansburiana																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	21	22	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	40		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Echinocereus spp.																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	1	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'98	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	40		-

Eriogonum microthecum																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	7	4	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	26	1	-	4	-	-	-	-	-	31	-	-	-	620	10	12	31

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'98	03%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	0		-
	'98	780		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
S	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	91	1	1	-	-	-	-	-	-	-	2	-	-	-	133			2
	98	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
M	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133	69	157	2
	91	1	-	-	1	-	-	-	1	-	3	-	-	-	200	71	43	3
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2
D	85	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	14%	00%	00%	-28%
'91	20%	00%	00%	-82%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	465	Dec:	14%
	'91	333		0%
	'98	60		0%

Mahonia repens																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	3	-	-	-	-	-	-	-	-	3	-	-	-	60	4	7	3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	60		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	5	-	-	-	-	-	-	-	-	3	-	2	-	100			5
M	85	12	-	-	-	-	-	-	-	-	12	-	-	-	800	7	10	12
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	26	-	-	-	-	-	-	-	-	24	-	2	-	520	6	14	26
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	6	4	-	-	-	-	-	-	-	2	-	-	8	666			10
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	-29%
'91	40%	00%	80%	- 7%
'98	00%	00%	13%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	933	Dec:		0%
'91	666			100%
'98	620			0%

Pinus edulis																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	1	-	-	-	-	1	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	0	Dec:	-
'91	0		-
'98	60		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	1	-	-	-	-	-	-	-	2	-	-	-	40			2
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	3	-	1	-	2	1	-	-	-	7	-	-	-	140	24	35	7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	33%	22%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	180		-

Quercus gambelii																		
S	85	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	85	9	-	-	-	-	-	-	-	-	9	-	-	-	600			9
	91	1	1	-	1	1	-	2	-	-	6	-	-	-	400			6
	98	10	13	4	-	-	-	-	-	-	27	-	-	-	540			27
M	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133	42	21	2
	91	-	2	1	-	1	-	-	-	-	4	-	-	-	266	59	18	4
	98	8	10	-	-	-	-	-	-	-	17	-	-	-	360	35	28	18
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	2	-	-	-	-	-	-	-	3	-	-	-	60			3
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	120			6

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	- 9%
'91	50%	10%	00%	+31%
'98	52%	08%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	733	Dec:	0%
	'91	666		0%
	'98	960		6%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Symphoricarpos oreophilus																		
S	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	9	-	-	-	-	-	-	-	-	9	-	-	-	600			9
	91	16	9	-	4	-	-	3	-	-	32	-	-	-	2133			32
	98	21	3	-	5	-	-	-	-	-	29	-	-	-	580			29
M	85	8	-	-	-	-	-	-	-	-	8	-	-	-	533	14	10	8
	91	-	-	1	-	1	-	1	-	-	3	-	-	-	200	11	11	3
	98	33	10	-	4	-	-	-	-	-	46	1	-	-	940	12	19	47
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	2	-	-	2	-	-	-	133			2
	98	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+54%
'91	27%	03%	00%	-38%
'98	17%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	1133	Dec:	0%
	'91	2466		5%
	'98	1540		1%

SUMMARY

WILDLIFE MANAGEMENT UNIT - 23 (45) - MONROE MOUNTAIN

In 1991, trend for soils was slightly downward or downward for all sites. Now three of the six sites, sites #2, #3, and #6 show trends that are stable to improving. All others demonstrated signs of downward trends for soil. With the prolonged drought, as on most other sites, trend for the herbaceous understory is down on four of the sites. The sites with down or slightly downward trends make the sites more susceptible to soil loss with high intensity summer storms. All sites show the effects of these high intensity storms for the most part. For browse, only sites #1 and #2 show trends that are stable to improving. All the other sites display downward trends.

Site	1991			1998		
	Soil	Browse	Grass & Forb	Soil	Browse	Grass & Forb
23-1 Bear Ridge	-	-	+	-	-	0/+
23-2 Sols Meadow	-	0/-	+	+	-	0
23-3 Thompson Basin	-	-	+	0/+	-	-
23-4 Poverty Flat	-	-	-	-	-	-
23-5 Smith Canyon	-	+	+	-	-	-
23-6 Koosharem Canyon	-	-	+	0	-	-

(0) = stable, (+) = upward, (-) = downward, (0/-) = stable to slightly downward, (0/+) = stable to slightly upward